New Product

OMRON

Digital Temperature Controller (Simple Type)

E5CC-800/E5CC-U-800 (48 × 48 mm)

Large White PV Display That's Easier to Read. Easy to Use, from Model Selection to Setup and Operation. A Complete Range of I/O Capacities, Functions, and Performance. Handles More Applications.

- The white PV display with a height of 15.2 mm improves visibility.
- High-speed sampling at 50 ms.
- Short body with depth of only 60 mm.
- Easy connections to a PLC with programless communications. Use component communications to link Temperature Controllers to each other.

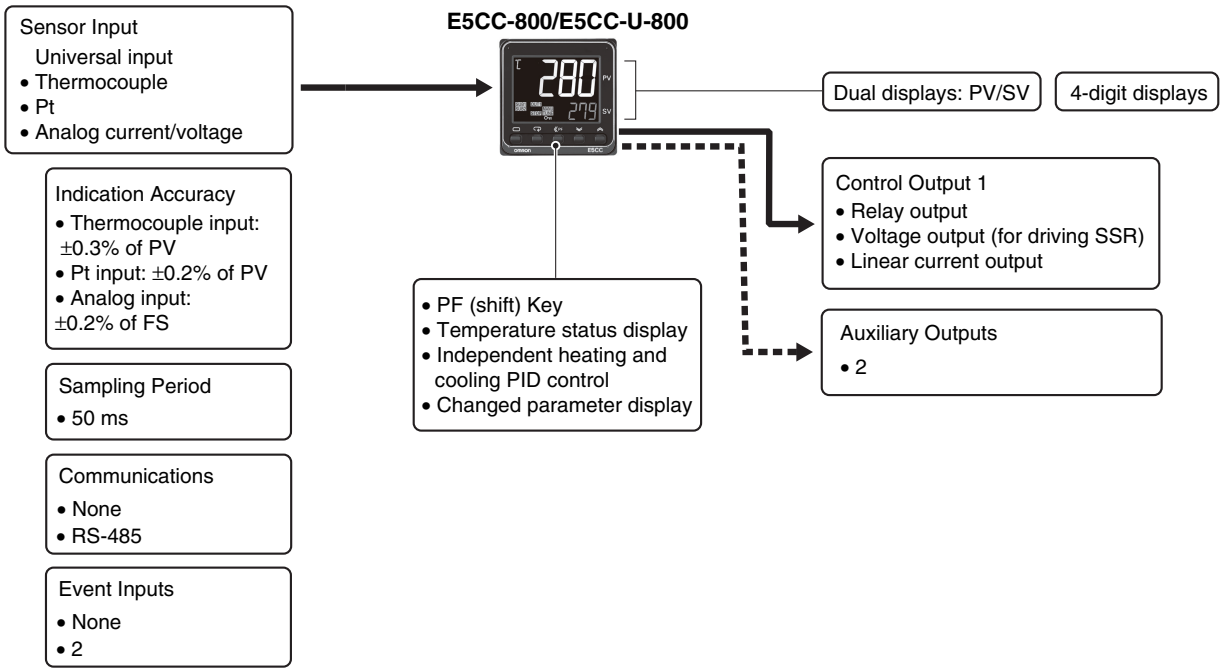
48 × 48 mm
E5CC-800

48 × 48 mm
E5CC-U-800

Refer to your OMRON website for the most recent information on applicable safety standards.

⚠ Refer to Safety Precautions on page 50.

Main I/O Functions



Model Number Legend and Standard Models

Model Number Legend

●Models with Screw Terminals

E5CC-800 48 × 48 mm

Control output 1	Auxiliary output	Communications	Heater burnout	Event inputs	Power supply voltage	Model
Relay output	Two	-	-	-	100 to 240 VAC	**E5CC-RX2ASM-800**
Voltage output						**E5CC-QX2ASM-800**
Linear current output						**E5CC-CX2ASM-800**
Relay output					24 VAC/VDC	**E5CC-RX2DSM-800**
Voltage output						**E5CC-QX2DSM-800**
Linear current output						**E5CC-CX2DSM-800**
Relay output			One	Two	100 to 240 VAC	**E5CC-RX2ASM-801**
Voltage output						**E5CC-QX2ASM-801**
Relay output					24 VAC/VDC	**E5CC-RX2DSM-801**
Voltage output						**E5CC-QX2DSM-801**
Relay output		RS-485		-	100 to 240 VAC	**E5CC-RX2ASM-802**
Voltage output						**E5CC-QX2ASM-802**
Relay output					24 VAC/VDC	**E5CC-RX2DSM-802**
Voltage output						**E5CC-QX2DSM-802**
Linear current output			-	Two	100 to 240 VAC	**E5CC-CX2ASM-804**
Linear current output					24 VAC/VDC	**E5CC-CX2DSM-804**

Model Number Legend

●Plug-in Models

E5CC-U-800 48 × 48 mm

Control output 1	Auxiliary output	Communications	Heater burnout	Event inputs	Power supply voltage	Model
Relay output	Two	-	-	-	100 to 240 VAC	**E5CC-RW2AUM-800**
Voltage output						**E5CC-QX2AUM-800**
Relay output					24 VAC/VDC	**E5CC-RW2DUM-800**
Voltage output						**E5CC-QX2DUM-800**

Heating and Cooling Control

● Using Heating and Cooling Control

① Control Output Assignment
An auxiliary output is used as the cooling control output.
② Control
If PID control is used, you can set PID control separately for heating and cooling.
This allows you to handle control systems with different heating and cooling response characteristics.

Optional Products (Order Separately)

Terminal Covers

Model
E53-COV17
E53-COV23

Note: The E53-COV10 cannot be used.
Refer to page 14 for the mounted dimensions.

Waterproof Packing (for E5CC)

Model
Y92S-P8

Note: This Waterproof Packing is provided with the Digital Temperature Controller.
The E5CC-U-800 cannot be waterproofed even if the Waterproof Packing is attached.

Current Transformers (CTs)

Hole diameter	Model
5.8 mm	**E54-CT1**
12.0 mm	**E54-CT3**

Adapter

Model
Y92F-45

Note: Use this Adapter when the panel has already been prepared for an E5B□ Controller.

DIN Track Mounting Adapter

Model
Y92F-52

Sockets (for E5CC-U-800)

Type	Model
Front-connecting Socket	**P2CF-11**
Front-connecting Socket with Finger Protection	**P2CF-11-E**
Back-connecting Socket	**P3GA-11**
Terminal Cover for Back-connecting socket with Finger Protection	**Y92A-48G**

Waterproof Cover

Model
Y92A-48N

Mounting Adapter

Model
Y92F-49

Note: This Mounting Adapter is provided with the Digital Temperature Controller.

Front Covers

Type	Model
Hard Front Cover	**Y92A-48H**
Soft Front Cover	**Y92A-48D**

Specifications

Ratings

Power supply voltage		A in model number: 100 to 240 VAC, 50/60 Hz D in model number: 24 VAC, 50/60 Hz; 24 VDC
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		5.2 VA max. at 100 to 240 VAC, and 3.1 VA max. at 24 VAC or 1.6 W max. at 24 VDC
Sensor input		Temperature input Thermocouple: K, J, T, E, L, U, N, R, S, B, W, or PL II Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor (ES1B): 10 to 70°C, 60 to 120°C, 115 to 165°C, or 140 to 260°C Analog input Current input: 4 to 20 mA or 0 to 20 mA Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V
Input impedance		Current input: 150 Ω max., Voltage input: 1 MΩ min. (Use a 1:1 connection when connecting the ES2-HB/THB.)
Control method		ON/OFF control or 2-PID control (with auto-tuning)
Control output	**Relay output**	E5CC-800: SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA E5CC-U-800: SPDT, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
	Voltage output (for driving SSR)	Output voltage: 12 VDC ±20% (PNP), max. load current: 21 mA, with short-circuit protection circuit
	Linear current output	4 to 20 mA DC/0 to 20 mA DC, load: 500 Ω max., resolution: approx. 10,000
Auxiliary output	**Number of outputs**	2
	Output specifications	SPST-NO relay outputs, 250 VAC, Models with 2 outputs: 3 A (resistive load), Electrical life: 100,000 operations, Minimum applicable load: 10 mA at 5 V
Event input	**Number of inputs**	2 or 4 (depends on model)
	External contact input specifications	Contact input: ON: 1 kΩ max., OFF: 100 kΩ min.
		Non-contact input: ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max.
		Current flow: Approx. 7 mA per contact
Setting method		Digital setting using front panel keys
Indication method		11-segment digital display and individual indicators Character height: PV: 15.2 mm, SV: 7.1 mm
Multi SP		Up to eight set points (SP0 to SP7) can be saved and selected using event inputs, key operations, or serial communications.
Other functions		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout (HB) alarm (including SSR failure (HS) alarm), 40% AT, 100% AT, MV limiter, input digital filter, self tuning, PV input shift, run/stop, protection functions, temperature status display, moving average of input value
Ambient operating temperature		-10 to 55°C (with no condensation or icing), for 3-year warranty: -10 to 50°C (with no condensation or icing)
Ambient operating humidity		25% to 85%
Storage temperature		-25 to 65°C (with no condensation or icing)
Altitude		2,000 m max.
Recommended fuse		T2A, 250 VAC, time lag, low shut-off capacity
Installation environment		Installation Category II, Pollution Class 2 (IEC 61010-1 compliant)

Note: There are no optional functions for the E5CC-U-800. Refer to *Model Number Legend* on page 2.

Input Ranges (Universal inputs)

●Thermocouple/Platinum Resistance Thermometer

Sensor type	Platinum resistance thermometer					Thermocouple															Infrared temperature sensor			
Sensor specification	Pt100			JPt100		K		J		T		E	L	U		N	R	S	B	W	PLII	10 to 70°C	60 to 120°C	115 to 165°C	140 to 260°C
Temperature range (°C)	850	500.0	100.0	500.0	100.0	1300	500.0	850	400.0	400	400.0	600	850	400	400.0	1300	1700	1700	1800	2300	1300	90	120	165	260
	0.0				0.0														100						
	-200	-199.9		199.9		-200	-20.0	-100	-20.0	-200	-199.9	-200	-100	-200	-199.9	-200	0	0		0	0	0	0	0	0
Set value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Shaded settings are the default settings.

The applicable standards for the input types are as follows:

K, J, T, E, N, R, S, B: JIS C 1602-1995, IEC 60584-1

L: Fe-CuNi, DIN 43710-1985

U: Cu-CuNi, DIN 43710-1985

W: W5Re/W26Re, ASTM E988-1990

JPt100: JIS C 1604-1989, JIS C 1606-1989

Pt100: JIS C 1604-1997, IEC 60751

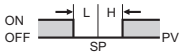
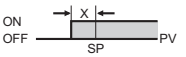
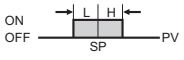
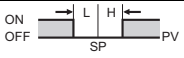
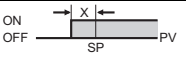
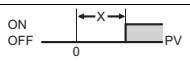
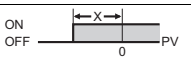
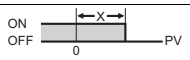
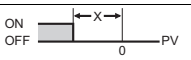
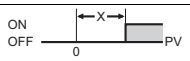
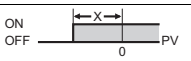
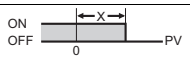
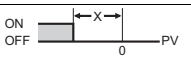
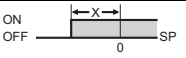
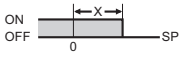
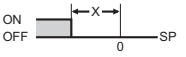
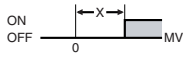
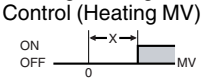
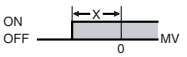
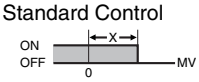
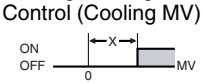
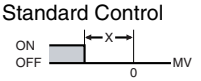
PL II: According to Platinel II electromotive force charts from BASF (previously Engelhard)

●Analog input

Input type	Current		Voltage		
Input specification	4 to 20 mA	0 to 20 mA	1 to 5 V	0 to 5 V	0 to 10 V
Setting range	Usable in the following ranges by scaling: -1999 to 9999, -199.9 to 999.9, -19.99 to 99.99 or -1.999 to 9.999				
Set value	25	26	27	28	29

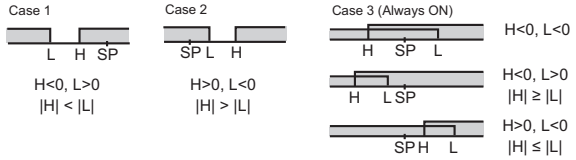
Alarm Outputs

Each alarm can be independently set to one of the following 19 alarm types. The default is 2: Upper limit. (see note.)
Auxiliary outputs are allocated for alarms. ON delays and OFF delays (0 to 999 s) can also be specified.

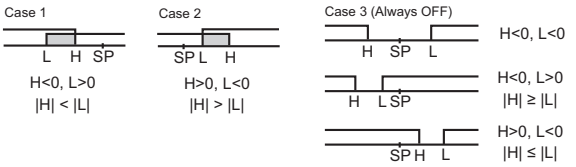
Set value	Alarm type	Alarm output operation		Description of function
		When alarm value X is positive	When alarm value X is negative	
0	Alarm function OFF	Output OFF		No alarm
1	Upper- and lower-limit *1		*2	Set the upward deviation in the set point for the alarm upper limit (H) and the lower deviation in the set point for the alarm lower limit (L). The alarm is ON when the PV is outside this deviation range.
2 (default)	Upper-limit			Set the upward deviation in the set point by setting the alarm value (X). The alarm is ON when the PV is higher than the SP by the deviation or more.
3	Lower-limit			Set the downward deviation in the set point by setting the alarm value (X). The alarm is ON when the PV is lower than the SP by the deviation or more.
4	Upper- and lower-limit range *1		*3	Set the upward deviation in the set point for the alarm upper limit (H) and the lower deviation in the set point for the alarm lower limit (L). The alarm is ON when the PV is inside this deviation range.
5	Upper- and lower-limit with standby sequence *1	*5 	*4	A standby sequence is added to the upper- and lower-limit alarm (1). *6
6	Upper-limit with standby sequence			A standby sequence is added to the upper-limit alarm (2). *6
7	Lower-limit with standby sequence			A standby sequence is added to the lower-limit alarm (3). *6
8	Absolute-value upper-limit			The alarm will turn ON if the process value is larger than the alarm value (X) regardless of the set point.
9	Absolute-value lower-limit			The alarm will turn ON if the process value is smaller than the alarm value (X) regardless of the set point.
10	Absolute-value upper-limit with standby sequence			A standby sequence is added to the absolute-value upper-limit alarm (8). *6
11	Absolute-value lower-limit with standby sequence			A standby sequence is added to the absolute-value lower-limit alarm (9). *6
12	LBA (alarm 1 type only)	-		*7
13	PV change rate alarm	-		*8
14	SP absolute value upper limit alarm			This alarm type turns ON the alarm when the set point (SP) is higher than the alarm value (X).
15	SP absolute value lower limit alarm			This alarm type turns ON the alarm when the set point (SP) is lower than the alarm value (X).
16	MV absolute value upper limit alarm *9	Standard Control  Heating/Cooling Control (Heating MV) 	Standard Control  Heating/Cooling Control (Heating MV) Always ON	This alarm type turns ON the alarm when the manipulated variable (MV) is higher than the alarm value (X).
17	MV absolute value lower limit alarm *9	Standard Control  Heating/Cooling Control (Cooling MV) 	Standard Control  Heating/Cooling Control (Cooling MV) Always ON	This alarm type turns ON the alarm when the manipulated variable (MV) is lower than the alarm value (X).

*1 With set values 1, 4 and 5, the upper and lower limit values can be set independently for each alarm type, and are expressed as “L” and “H.”

*2 Set value: 1, Upper- and lower-limit alarm



*3 Set value: 4, Upper- and lower-limit range



*4 Set value: 5, Upper- and lower-limit with standby sequence
For Upper- and Lower-Limit Alarm Described Above *2
- Case 1 and 2
Always OFF when the upper-limit and lower-limit hysteresis overlaps.
- Case 3: Always OFF

*5. Set value: 5, Upper- and lower-limit with standby sequence
Always OFF when the upper-limit and lower-limit hysteresis overlaps.

*6 Refer to the E5□C Digital Controllers User's Manual (Cat. No. H174) for information on the operation of the standby sequence.

*7 Refer to the E5□C Digital Controllers User's Manual (Cat. No.H174) for information on the loop burnout alarm (LBA).

*8 Refer to the E5□C Digital Controllers User's Manual (Cat. No. H174) for information on the PV change rate alarm.

*9 When heating/cooling control is performed, the MV absolute upper limit alarm functions only for the heating operation and the MV absolute lower limit alarm functions only for the cooling operation.

Characteristics

Indication accuracy (at the ambient temperature of 23°C)		E5CC-800 Thermocouple: (±0.3% of PV or ±1°C, whichever is greater) ±1 digit max. *1 Platinum resistance thermometer: (±0.2% of PV or ±0.8°C, whichever is greater) ±1 digit Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max. E5CC-U-800 Thermocouple: (±1% of PV or ±2°C, whichever is greater) ±1 digit max. *1 Platinum resistance thermometer: (±0.2% of PV or ±0.8°C, whichever is greater) ±1 digit Analog input: ±0.2% FS ±1 digit max.
Simple transfer output accuracy		±0.3% FS max.*2
Influence of temperature *3		Thermocouple input (R, S, B, W, PL II): (±1% of PV or ±10°C, whichever is greater) ±1 digit max. Other thermocouple input: (±1% of PV or ±4°C, whichever is greater) ±1 digit max. *4 Platinum resistance thermometer: (±1% of PV or ±2°C, whichever is greater) ±1 digit max. Analog input: ±1%FS ±1 digit max. CT input: ±5%FS ±1 digit max.
Influence of voltage *3		
Influence of EMS. (at EN 61326-1)		
Input sampling period		50 ms
Hysteresis		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.01% to 99.99% FS (in units of 0.01% FS)
Proportional band (P)		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.1% to 999.9% FS (in units of 0.1% FS)
Integral time (I)		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
Derivative time (D)		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
Proportional band (P) for cooling		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.1% to 999.9% FS (in units of 0.1% FS)
Integral time (I) for cooling		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
Derivative time (D) for cooling		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
Control period		0.1, 0.2, 0.5, 1 to 99 s (in units of 1 s)
Manual reset value		0.0 to 100.0% (in units of 0.1%)
Alarm setting range		-1999 to 9999 (decimal point position depends on input type)
Affect of signal source resistance		Thermocouple: 0.1°C/Ω max. (100 Ωmax.) Platinum resistance thermometer: 0.1°C/Ω max. (10 Ω max.)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		3,000 VAC, 50/60 Hz for 1 min between terminals of different charge
Vibration	**Malfunction**	10 to 55 Hz, 20 m/s^2 for 10 min each in X, Y, and Z directions
	Resistance	10 to 55 Hz, 20 m/s^2 for 2 hrs each in X, Y, and Z directions
Shock	**Malfunction**	100 m/s^2, 3 times each in X, Y, and Z directions
	Resistance	300 m/s^2, 3 times each in X, Y, and Z directions
Weight		E5CC-800: Controller: Approx. 120 g, Mounting Bracket: Approx. 10 g E5CC-U-800: Controller: Approx. 100 g, Mounting Bracket: Approx. 10 g
Degree of protection		E5CC-800: Front panel: IP66, Rear case: IP20, Terminals: IP00 E5CC-U-800: Front panel: IP50, Rear case: IP20, Terminals: IP00
Memory protection		Non-volatile memory (number of writes: 1,000,000 times)
Standards	**Approved standards**	UL 61010-1*7, Korean Radio Waves Act (Act 10564)
	Conformed standards	EN 61010-1 (IEC 61010-1): Pollution level 2, overcurrent category II, Lloyd's standards *6
EMC		EMI: EN 61326-1 *8 Radiated Interference Electromagnetic Field Strength: EN 55011 Group 1, class A Noise Terminal Voltage: EN 55011 Group 1, class A EMS: EN 61326-1 *8 ESD Immunity: EN 61000-4-2 Electromagnetic Field Immunity: EN 61000-4-3 Burst Noise Immunity: EN 61000-4-4 Conducted Disturbance Immunity: EN 61000-4-6 Surge Immunity: EN 61000-4-5 Voltage Dip/Interrupting Immunity: EN 61000-4-11

*1 The indication accuracy of K thermocouples in the -200 to 1300°C range, T and N thermocouples at a temperature of -100°C max., and U and L thermocouples at any temperatures is ±2°C ±1 digit max. The indication accuracy of the B thermocouple at a temperature of 400°C max. is not specified. The indication accuracy of B thermocouples at a temperature of 400 to 800° is ±3°C max. The indication accuracy of the R and S thermocouples at a temperature of 200°C max. is ±3°C ±1 digit max. The indication accuracy of W thermocouples is (±0.3% of PV or ±3°C, whichever is greater) ±1 digit max. The indication accuracy of PL II thermocouples is ±0.3% of PV or ±2°C, whichever is greater, ±1 digit max.
*2 However, the precision between 0 and 4 mA for a 0 to 20 mA output is ±1% FS max.
*3 Ambient temperature: -10°C to 23°C to 55°C, Voltage range: -15% to 10% of rated voltage
*4 K thermocouple at -100°C max.: ±10°C max.
*5 The unit is determined by the setting of the Integral/Derivative Time Unit parameter.
*6 Refer to information on maritime standards in *Shipping Standards* on page 52 for compliance with Lloyd's Standards. The E5CC-U is scheduled to obtain certification in January, 2014.
*7 The E5CC-U-800 plug-in model is certified for UL listing only when used together with the OMRON P2CF-11 or P2CF-11-E socket. The P3GA-11 is not certified for UL listing.
*8 Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

Communications Specifications

Transmission line connection method	RS-485: Multidrop
Communications	RS-485 (two-wire, half duplex)
Synchronization method	Start-stop synchronization
Protocol	CompoWay/F, or Modbus
Baud rate*	9600, 19200, 38400, or 57600 bps
Transmission code	ASCII
Data bit length*	7 or 8 bits
Stop bit length*	1 or 2 bits
Error detection	Vertical parity (none, even, odd) Block check character (BCC) with CompoWay/F or CRC-16 Modbus
Flow control	None
Interface	RS-485
Retry function	None
Communications buffer	217 bytes
Communications response wait time	0 to 99 ms Default: 20 ms

* The baud rate, data bit length, stop bit length, and vertical parity can be individually set using the Communications Setting Level.

Communications Functions

Programless communications*1	You can use the memory in the PLC to read and write E5□C parameters, start and stop operation, etc. The E5□C automatically performs communications with PLCs. No communications programming is required. Number of connected Temperature Controllers: 32 max. (Up to 16 for the FX Series) Applicable PLCs OMRON PLCs CS Series, CJ Series, or CP Series Mitsubishi Electric PLCs MELSEC Q Series, L Series, or FX Series (compatible with the FX2 or FX3 (excluding the FX1S)) KEYENCE PLCs KEYENCE KV Series
Component Communications*1	When Digital Temperature Controllers are connected, set points and RUN/STOP commands can be sent from the Digital Temperature Controller that is set as the master to the Digital Temperature Controllers that are set as slaves. Slope and offsets can be set for the set point. Number of connected Digital Temperature Controllers: 32 max. (including master)
Copying*2	When Digital Temperature Controllers are connected, the parameters can be copied from the Digital Temperature Controller that is set as the master to the Digital Temperature Controllers that are set as slaves.

MELSEC is a registered trademark of Mitsubishi Electric Corporation.
KEYENCE is a registered trademark of Keyence Corporation.

*1 A Temperature Controller with version 1.1 or higher is required. A Temperature Controller with version 2.1 or higher is required for the FX Series or the KV Series.
*2 Both the programless communications and the component communications support the copying.

Current Transformer (Order Separately) Ratings

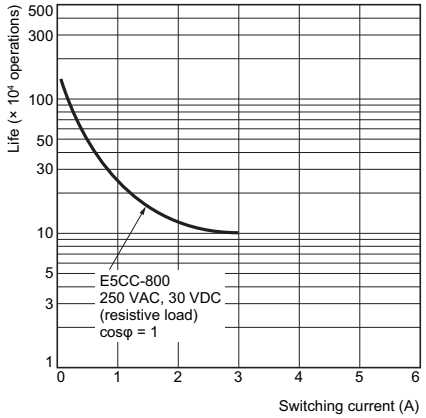
Dielectric strength	1,000 VAC for 1 min
Vibration resistance	50 Hz, 98 m/s^2
Weight	E54-CT1: Approx. 11.5 g, E54-CT3: Approx. 50 g
Accessories (E54-CT3 only)	Armatures (2) Plugs (2)

Heater Burnout Alarms and SSR Failure Alarms

CT input (for heater current detection)	Models with detection for single-phase heaters: One input Models with detection for single-phase or three-phase heaters: Two inputs
Maximum heater current	50 A AC
Input current indication accuracy	±5% FS ±1 digit max.
Heater burnout alarm setting range *1	0.1 to 49.9 A (in units of 0.1 A) Minimum detection ON time: 100 ms *3
SSR failure alarm setting range *2	0.1 to 49.9 A (in units of 0.1 A) Minimum detection OFF time: 100 ms *4

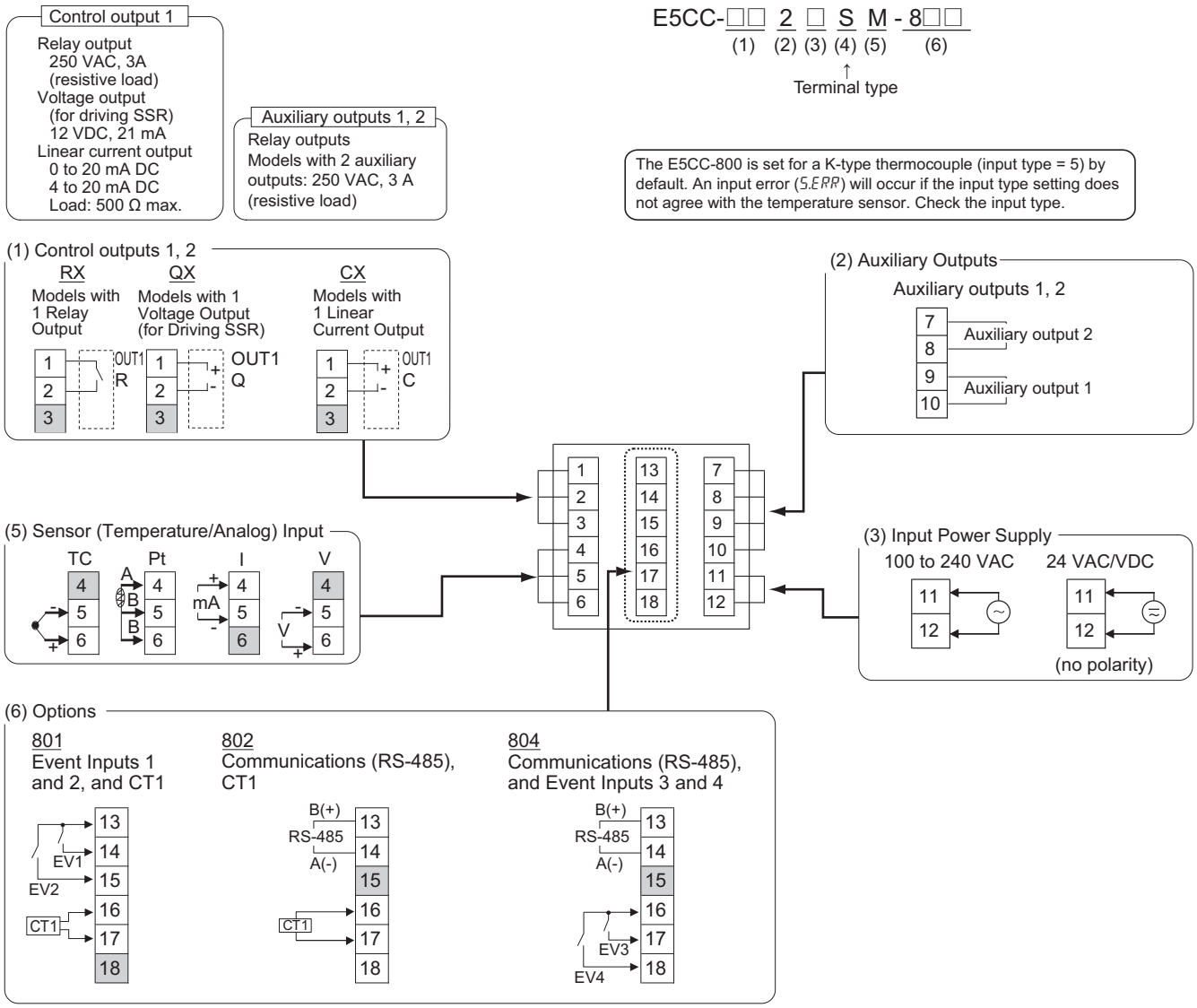
*1 For heater burnout alarms, the heater current will be measured when the control output is ON, and the output will turn ON if the heater current is lower than the set value (i.e., heater burnout detection current value).
*2 For SSR failure alarms, the heater current will be measured when the control output is OFF, and the output will turn ON if the heater current is higher than the set value (i.e., SSR failure detection current value).
*3 The value is 30 ms for a control period of 0.1 s or 0.2 s.
*4 The value is 35 ms for a control period of 0.1 s or 0.2 s.

Electrical Life Expectancy Curve for Relays (Reference Values)

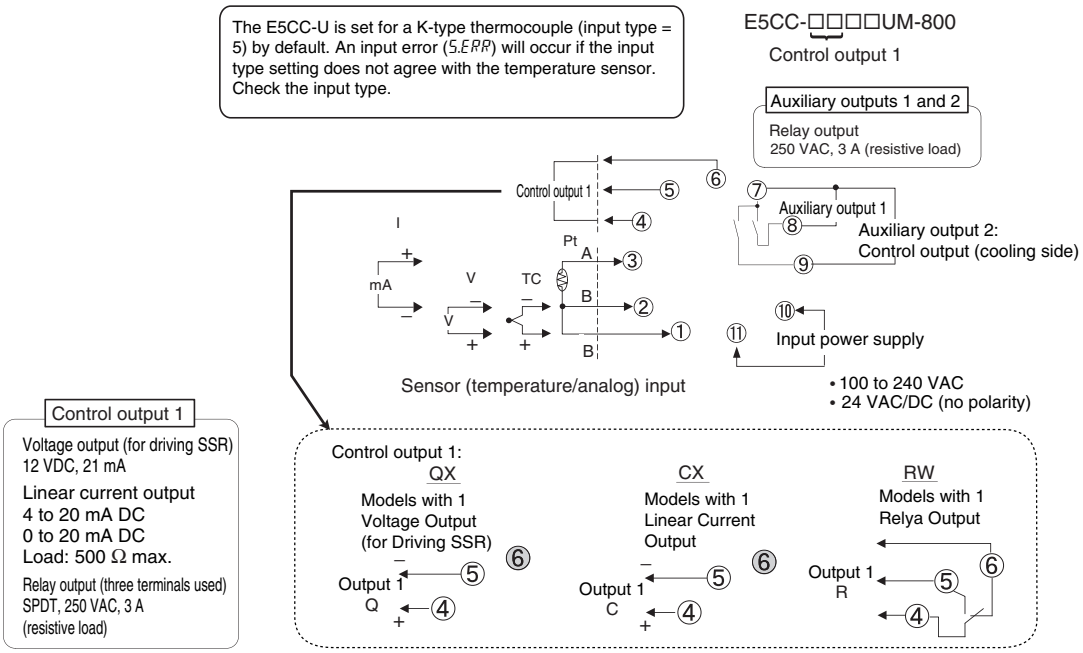


External Connections

E5CC-800



E5CC-U-800



Note: 1. The application of the terminals depends on the model.

2. Do not wire the terminals that are shown with a gray background.

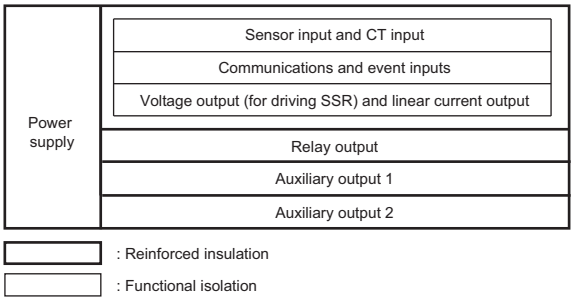
3. When complying with EMC standards, the cable that connects the sensor must be 30 m or less. If the cable length exceeds 30 m, compliance with EMC standards will not be possible.

4. Connect M3 crimped terminals.
Connect M3.5 crimped terminals for the E5CC-U-800.

Isolation/Insulation Block Diagrams

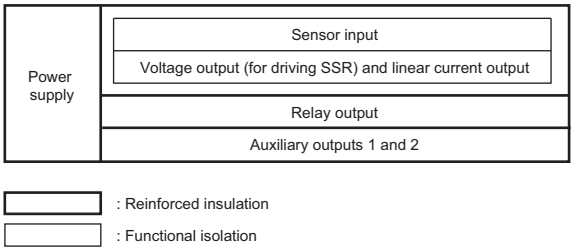
- E5CC-800

Models with 2 Auxiliary Outputs



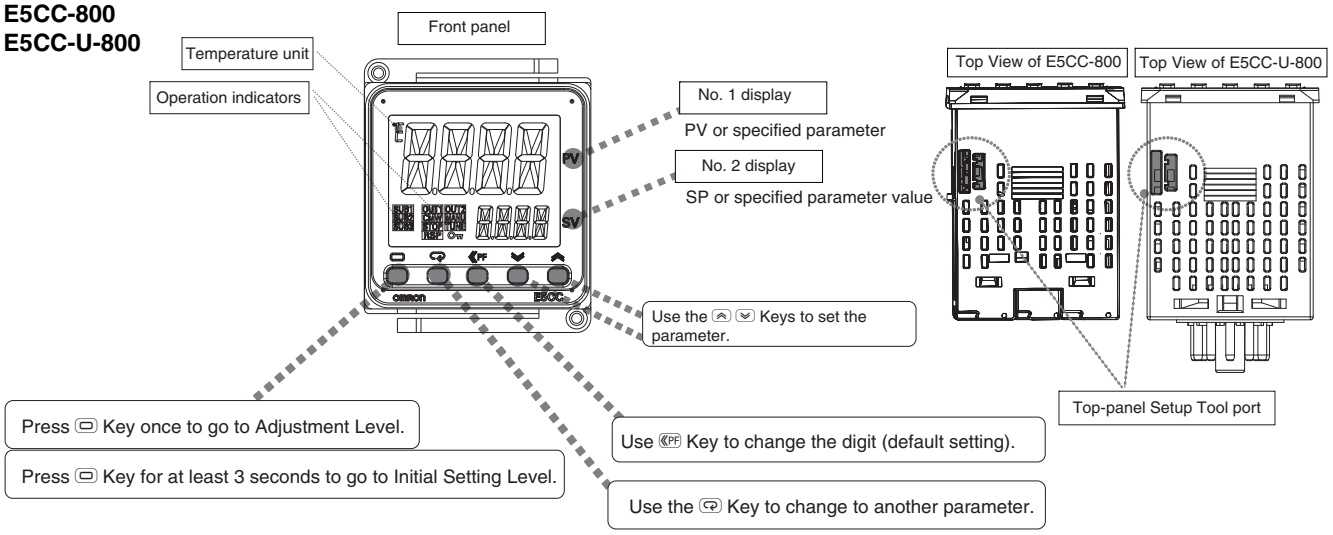
- E5CC-U-800

Models with 2 Auxiliary Outputs



Nomenclature

E5CC-800
E5CC-U-800

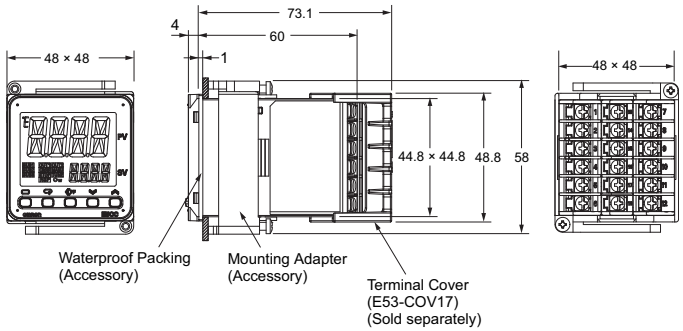

Front panel
Temperature unit
Operation indicators
No. 1 display
PV or specified parameter
No. 2 display
SP or specified parameter value
Use the ▲ ▼ Keys to set the parameter.
Top View of E5CC-800
Top View of E5CC-U-800
Top-panel Setup Tool port
Press Mode Key once to go to Adjustment Level.
Press Mode Key for at least 3 seconds to go to Initial Setting Level.
Use PF Key to change the digit (default setting).
Use the R/S Key to change to another parameter.

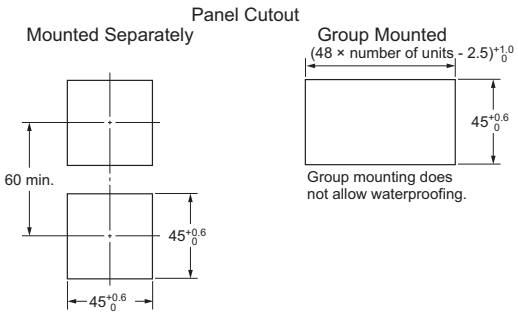
Dimensions

(Unit: mm)

Controllers

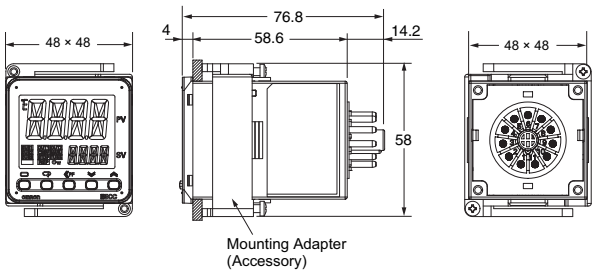
E5CC-800





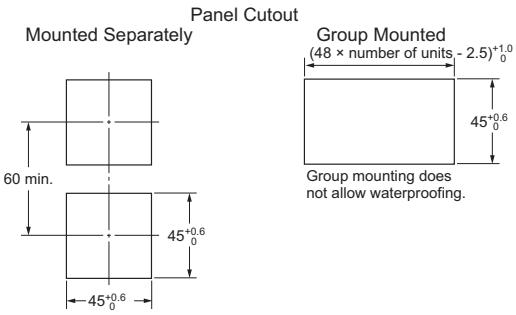
- Recommended panel thickness is 1 to 5 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller.
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.
- To attach the USB-Serial Conversion Cable to the control panel, use a panel thickness of 1 to 2.5 mm.

E5CC-U-800



The Setup Tool port is on the top of the Temperature Controller.
It is used to connect the Temperature Controller to the computer to use the Setup Tool.
The E58-CIFQ2 USB-Serial Conversion Cable is required to make the connection.
Refer to the instructions that are provided with the USB-Serial Conversion Cable for the connection procedure.

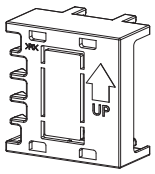
Note: Do not leave the USB-Serial Conversion Cable connected when you use the Temperature Controller.

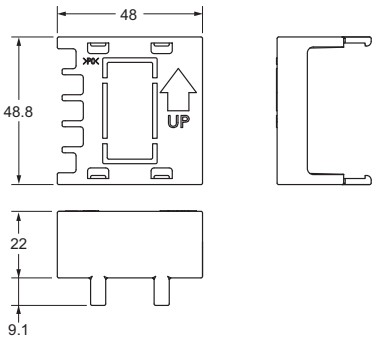


- Recommended panel thickness is 1 to 5 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.
- To attach the USB-Serial Conversion Cable to the control panel, use a panel thickness of 1 to 2.5 mm.

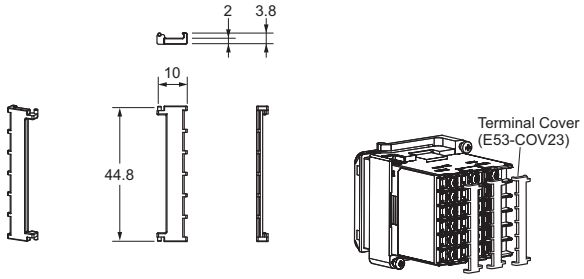
Accessories (Order Separately)

● **Terminal Covers**
E53-COV17

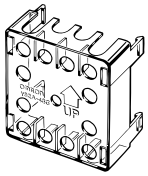


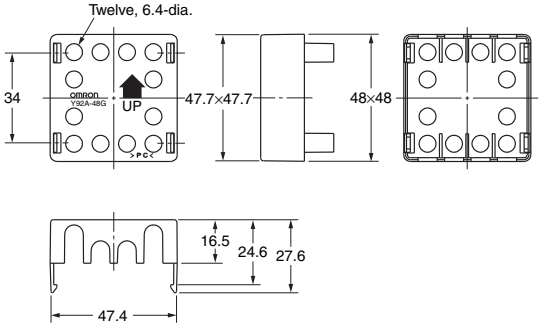


● **Terminal Covers**
E53-COV23 (Three Covers provided.)



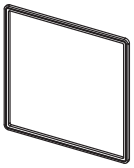
● **Terminal Cover (for the P3GA-11 Back-connecting Socket)**
Y92A-48G





Note: You can attach the P3GA-11 Back-connecting Socket for finger protection.

● **Waterproof Packing**
Y92S-P8 (for DIN 48 × 48)
(Provided with the Controller.)

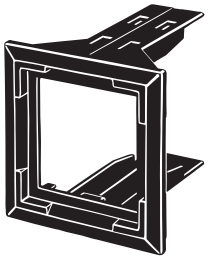


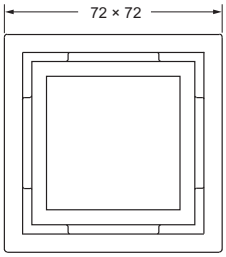
The waterproof packing is provided only with the E5CC-800.
Order the Waterproof Packing separately if it becomes lost or damaged.
The Waterproof Packing can be used to achieve an IP66 degree of protection.
(Deterioration, shrinking, or hardening of the waterproof packing may occur depending on the operating environment. Therefore, periodic replacement is recommended to ensure the level of waterproofing specified in IP66. The time for periodic replacement depends on the operating environment. Be sure to confirm this point at your site.
Consider three years a rough standard.)
The Waterproof Packing does not need to be attached if a waterproof structure is not required.
The E5CC-U cannot be waterproofed even if the Waterproof Packing is attached.

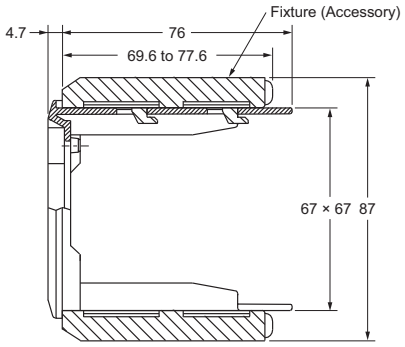
● Adapter

Y92F-45

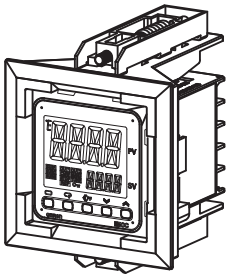
Note: 1. Use this Adapter when the Front Panel has already been prepared for the E5B□.
2. Only black is available.

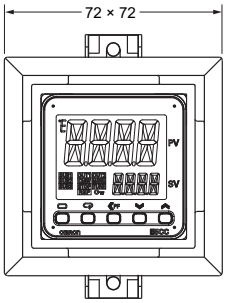


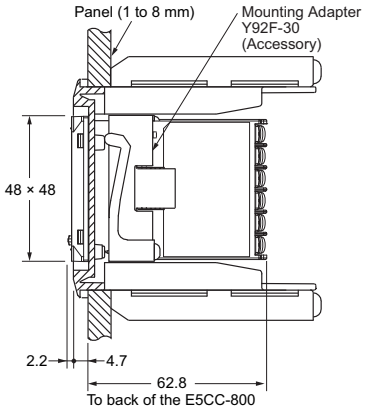




Mounted to E5CC-800



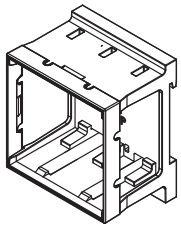


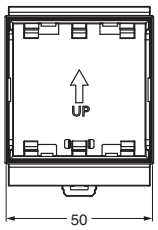


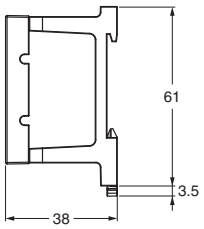
● DIN Track Mounting Adapter

Y92F-52

Note: 1. This Adapter cannot be used together with the Terminal Cover.
2. Remove the Terminal Cover to use the Adapter.

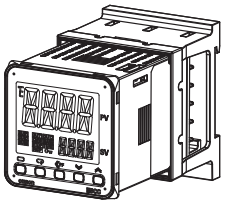


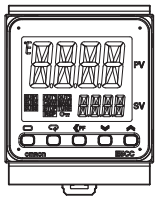


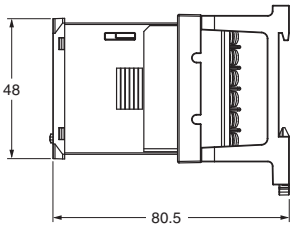


This Adapter is used to mount the E5CC-800 to a DIN Track.
If you use the Adapter, there is no need for a plate to mount in the panel or to drill mounting holes in the panel.

Mounted to E5CC-800

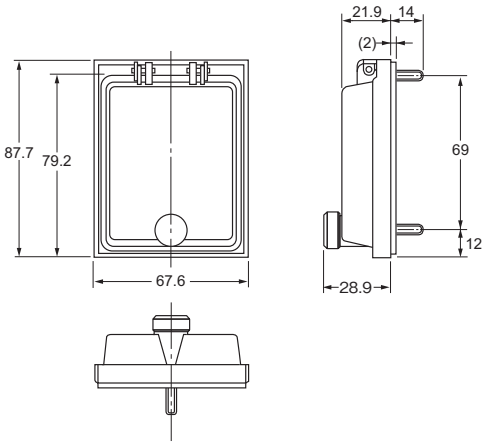






● Watertight Cover

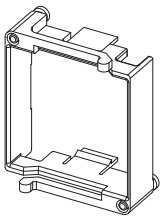
Y92A-48N



● Mounting Adapter

Y92F-49

(Provided with the Controller.)

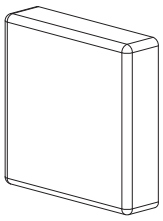


The Mounting Adapter is provided with the Temperature Controller.
Order this Adapter separately if it becomes lost or damaged.

● Protective Cover

Y92A-48D

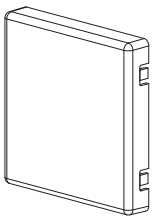
Note: This Protective Cover cannot be used if the Waterproof Packing is installed.



This Protective Cover is soft type.
It is able to operate the controller with using this cover.

● Protective Cover

Y92A-48H

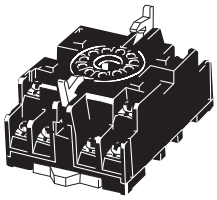


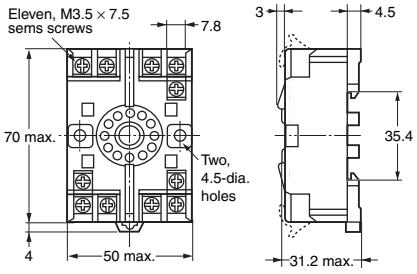
This Protective Cover is hard type.
Please use it for the mis-operation prevention etc.

● E5CC-U Wiring Socket

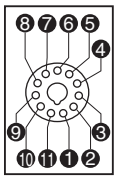
Front-connecting Socket

P2CF-11

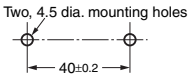




Terminal Layout/Internal Connections
(Top View)



Mounting Holes

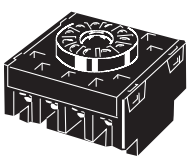


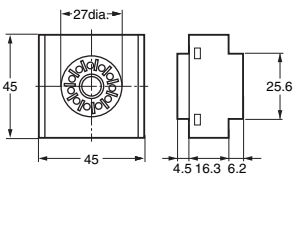
Note: Can also be mounted to a DIN track

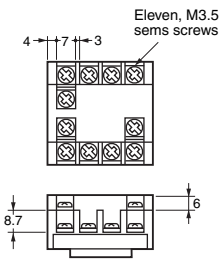
Note: 1. A model with finger protection (P2CF-11-E) is also available.
2. You cannot use the P2CF-11 or P2CF-11-E together with the Y92F-45.

Back-connecting Socket

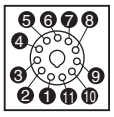
P3GA-11







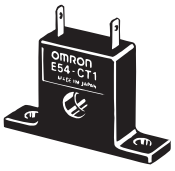
Terminal Layout/Internal Connections
(Bottom View)

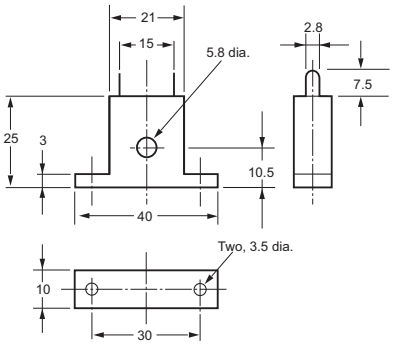


Note: 1. Using any other sockets will adversely affect accuracy. Use only the specified sockets.
2. A Protective Cover for finger protection (Y92A-48G) is also available.
3. You cannot use the P3GA-11 together with the Y92F-45.

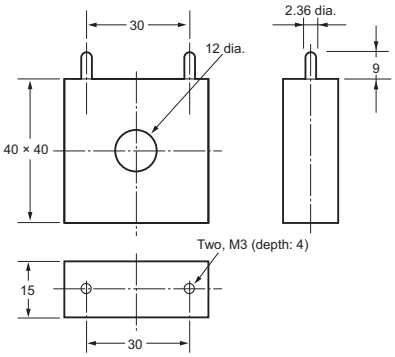
● Current Transformers

E54-CT1



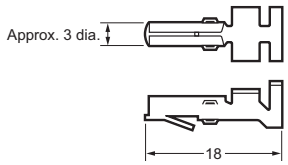


E54-CT3

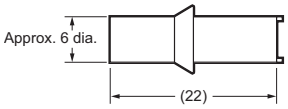


E54-CT3 Accessories

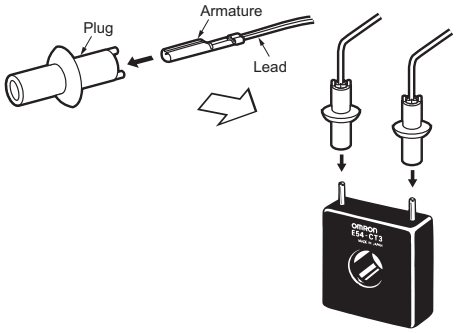
- **Armature**



- **Plug**



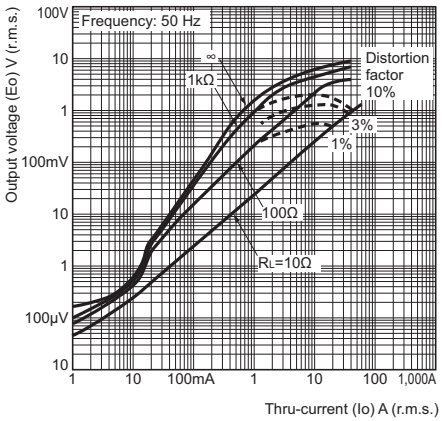
Connection Example



Thru-current (Io) vs. Output Voltage (Eo) (Reference Values)

E54-CT1

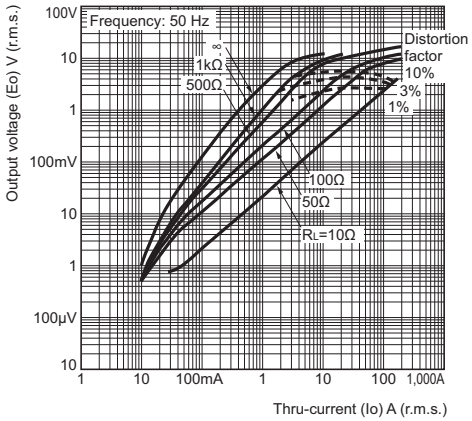
Maximum continuous heater current: 50 A (50/60 Hz)
Number of windings: 400±2
Winding resistance: 18±2 Ω



Thru-current (Io) vs. Output Voltage (Eo) (Reference Values)

E54-CT3

Maximum continuous heater current: 120 A (50/60 Hz)
(Maximum continuous heater current for an OMRON Digital Temperature Controller is 50 A.)
Number of windings: 400±2
Winding resistance: 8±0.8 Ω



MEMO

Digital Temperature Controller (Simple Type)

E5EC/E5AC-800 (48 × 96 mm/96 × 96 mm)

Large White PV Display That's Easier to Read. Easy to Use, from Model Selection to Setup and Operation. A Complete Range of I/O Capacities, Functions, and Performance. Handles More Applications.

- A white LCD PV display with a height of approx. 18 mm for the E5EC-800 and 25 mm for the E5AC-800 improves visibility.
- High-speed sampling at 50 ms.
- Short body with depth of only 60 mm.
- Easy connections to a PLC with programless communications. Use component communications to link Temperature Controllers to each other.
- The new position-proportional control models allow you to control valves as well.

48 × 96 mm
E5EC-800

96 × 96 mm
E5AC-800

Refer to your OMRON website for the most recent information on applicable safety standards.

⚠ **Refer to Safety Precautions on page 50.**

Main I/O Functions

Sensor Input
Universal input
- Thermocouple
- Pt
- Analog current/voltage

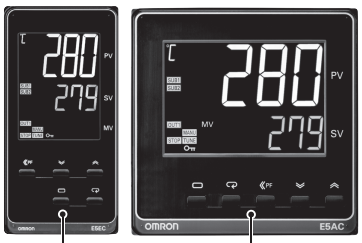
Indication Accuracy
- Thermocouple input: ±0.3% of PV
- Pt input: ±0.2% of PV
- Analog input: ±0.2% of FS

Sampling Period
- 50 ms

Communications
- None
- RS-485

Event Inputs
- None
- 2
- 4

E5EC-800 **E5AC-800**



- PF (shift) Key
- Temperature status display
- Independent heating and cooling PID control
- Changed parameter display

Dual displays: PV/SV | 4-digit displays

Control Output 1
- Relay output
- Voltage output (for driving SSR)
- Linear current output

Control Output 2
- None
- Relay output

Auxiliary Outputs
- 1, 2, or 3

Model Number Legend and Standard Models

Model Number Legend

●Models with Screw Terminals

E5EC-800 48 × 96 mm

Control output 1	Control output 2	Auxiliary output	Communications	Heater burnout	Event inputs	Power supply voltage	Model
Relay output	-	Two	-	-	-	100 to 240 VAC	E5EC-RX2ASM-800
Voltage output	-						E5EC-QX2ASM-800
Linear current output	-						E5EC-CX2ASM-800
Relay output	Relay output						E5EC-RR2ASM-800
Voltage output	Relay output						E5EC-QR2ASM-800
Linear current output	Relay output						E5EC-CR2ASM-800
Relay output	-					24 VAC/VDC	E5EC-RX2DSM-800
Voltage output	-						E5EC-QX2DSM-800
Linear current output	-						E5EC-CX2DSM-800
Relay output	Relay output						E5EC-RR2DSM-800
Voltage output	Relay output						E5EC-QR2DSM-800
Linear current output	Relay output						E5EC-CR2DSM-800
Relay output	Relay output		RS-485	One	Two	100 to 240 VAC	E5EC-RR2ASM-808
Voltage output	Relay output						E5EC-QR2ASM-808
Relay output	Relay output					24 VAC/VDC	E5EC-RR2DSM-808
Voltage output	Relay output						E5EC-QR2DSM-808
Relay output	Relay output		-		Four	100 to 240 VAC	E5EC-RR2ASM-810
Voltage output	Relay output						E5EC-QR2ASM-810
Relay output	Relay output					24 VAC/VDC	E5EC-RR2DSM-810
Voltage output	Relay output						E5EC-QR2DSM-810
Linear current output	Relay output		RS-485	-	Two	100 to 240 VAC	E5EC-CR2ASM-804
Linear current output	Relay output					24 VAC/VDC	E5EC-CR2DSM-804
Relay output (Open)*	Relay output (Close)*	-	-	-	-	100 to 240 VAC	E5EC-PR0ASM-800
Relay output (Open)*	Relay output (Close)*	Two					E5EC-PR2ASM-800
Relay output (Open)*	Relay output (Close)*		RS-485		Two		E5EC-PR2ASM-804

* Position proportional control model.

E5AC-800 48 × 96 mm

Control output 1	Control output 2	Auxiliary output	Communications	Heater burnout	Event inputs	Power supply voltage	Model
Relay output	-	One	-	-	-	100 to 240 VAC	E5AC-RX1ASM-800
Voltage output	-						E5AC-QX1ASM-800
Linear current output	-						E5AC-CX1ASM-800
Relay output	-	Three					E5AC-RX3ASM-800
Voltage output	-						E5AC-QX3ASM-800
Linear current output	-						E5AC-CX3ASM-800
Relay output	-	One				24 VAC/VDC	E5AC-RX1DSM-800
Voltage output	-						E5AC-QX1DSM-800
Linear current output	-						E5AC-CX1DSM-800
Relay output	-	Three					E5AC-RX3DSM-800
Voltage output	-						E5AC-QX3DSM-800
Linear current output	-						E5AC-CX3DSM-800
Relay output	-		RS-485	One	Two	100 to 240 VAC	E5AC-RX3ASM-808
Voltage output	-						E5AC-QX3ASM-808
Relay output	-					24 VAC/VDC	E5AC-RX3DSM-808
Voltage output	-						E5AC-QX3DSM-808
Relay output	-		-		Four	100 to 240 VAC	E5AC-RX3ASM-810
Voltage output	-						E5AC-QX3ASM-810
Relay output	-					24 VAC/VDC	E5AC-RX3DSM-810
Voltage output	-						E5AC-QX3DSM-810
Linear current output	-		RS-485	-	Two	100 to 240 VAC	E5AC-CX3ASM-804
Linear current output	-					24 VAC/VDC	E5AC-CX3DSM-804
Relay output (Open)*	Relay output (Close)*	-	-	-	-	100 to 240 VAC	E5AC-PR0ASM-800
Relay output (Open)*	Relay output (Close)*	Two					E5AC-PR2ASM-800
Relay output (Open)*	Relay output (Close)*		RS-485		Two		E5AC-PR2ASM-804

* Position proportional control model.

Heating and Cooling Control

I Using Heating and Cooling Control

① Control Output Assignment
If there is no control output 2, an auxiliary output is used as the cooling control output.
If there is a control output 2, the two control outputs are used for heating and cooling.
(It does not matter which output is used for heating and which output is used for cooling.)
② Control
If PID control is used, you can set PID control separately for heating and cooling.
This allows you to handle control systems with different heating and cooling response characteristics.

Optional Products (Order Separately)

Terminal Covers

Model
E53-COV24

Waterproof Packing

Applicable Controller	Model
E5EC-800	Y92S-P9
E5AC-800	Y92S-P10

Note: This Waterproof Packing is provided with the Digital Temperature Controller.

Waterproof Cover

Applicable Controller	Model
E5EC-800	Y92A-49N
E5AC-800	Y92A-96N

Front Port Cover

Model
Y92S-P7

Note: This Front Port Cover is provided with the Digital Temperature Controller.

Mounting Adapter

Model
Y92F-51 (Two Adapters are included.)

Note: This Mounting Adapter is provided with the Digital Temperature Controller.

Current Transformers (CTs)

Hole diameter	Model
5.8 mm	E54-CT1
12.0 mm	E54-CT3

Specifications

Ratings

Power supply voltage		A in model number: 100 to 240 VAC, 50/60 Hz D in model number: 24 VAC, 50/60 Hz; 24 VDC
Operating voltage range		85% to 110% of rated supply voltage
Power consumption	**E5EC-800**	6.6 VA max. at 100 to 240 VAC, and 4.1 VA max. at 24 VAC or 2.3 W max. at 24 VDC
	E5AC-800	7.0 VA max. at 100 to 240 VAC, and 4.2 VA max. at 24 VAC or 2.4 W max. at 24 VDC
Sensor input		Temperature input Thermocouple: K, J, T, E, L, U, N, R, S, B, W, or PL II Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor (ES1B): 10 to 70°C, 60 to 120°C, 115 to 165°C, or 140 to 260°C Analog input Current input: 4 to 20 mA or 0 to 20 mA Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V
Input impedance		Current input: 150 Ω max., Voltage input: 1 MΩ min. (Use a 1:1 connection when connecting the ES2-HB/THB.)
Control method		ON/OFF control or 2-PID control (with auto-tuning)
Control output	**Relay output**	SPST-NO, 250 VAC, 5 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
	Voltage output (for driving SSR)	Output voltage: 12 VDC ±20% (PNP), max. load current: 40 mA, with short-circuit protection circuit (The maximum load current is 21 mA for models with two control outputs.)
	Linear current output	4 to 20 mA DC/0 to 20 mA DC, load: 500 Ω max., resolution: approx. 10,000
Auxiliary output	**Number of outputs**	1, 2, or 3 (depends on model)
	Output specifications	SPST-NO relay outputs, 250 VAC, Models with 2 outputs: 3 A (resistive load), Electrical life: 100,000 operations, Minimum applicable load: 10 mA at 5 V
Event input	**Number of inputs**	2 or 4 (depends on model)
	External contact input specifications	Contact input: ON: 1 kΩ max., OFF: 100 kΩ min.
		Non-contact input: ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max.
		Current flow: Approx. 7 mA per contact
Potentiometer input		100 Ω to 10 kΩ
Setting method		Digital setting using front panel keys
Indication method		11-segment digital display and individual indicators Character height: E5EC-800: PV: 18.0 mm, SV: 11.0 mm E5AC-800: PV: 25.0 mm, SV: 15.0 mm
Multi SP		Up to eight set points (SP0 to SP7) can be saved and selected using event inputs, key operations, or serial communications.
Bank switching		None
Other functions		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout (HB) alarm (including SSR failure (HS) alarm), 40% AT, 100% AT, MV limiter, input digital filter, self tuning, PV input shift, run/stop, protection functions, temperature status display, moving average of input value, FB moving average
Ambient operating temperature		-10 to 55°C (with no condensation or icing), for 3-year warranty: -10 to 50°C (with no condensation or icing)
Ambient operating humidity		25% to 85%
Storage temperature		-25 to 65°C (with no condensation or icing)
Altitude		2,000 m max.
Recommended fuse		T2A, 250 VAC, time lag, low shut-off capacity
Installation environment		Installation Category II, Pollution Class 2 (IEC 61010-1 compliant)

Input Ranges (Universal inputs)

●Thermocouple/Platinum Resistance Thermometer

Sensor type	Platinum resistance thermometer					Thermocouple															Infrared temperature sensor			
Sensor specification	Pt100			JPt100		K		J		T		E	L	U		N	R	S	B	W	PLII	10 to 70°C	60 to 120°C	115 to 165°C	140 to 260°C
Temperature range (°C)	850	500.0	100.0	500.0	100.0	1300	500.0	850	400.0	400	400.0	600	850	400	400.0	1300	1700	1700	1800	2300	1300	90	120	165	260
	-200	-199.9	0.0	-199.9	0.0	-200	-20.0	-100	-20.0	-200	-199.9	-200	-100	-200	-199.9	-200	0	0	100	0	0	0	0	0	0
Set value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Shaded settings are the default settings.

The applicable standards for the input types are as follows:

K, J, T, E, N, R, S, B: JIS C 1602-1995, IEC 60584-1

L: Fe-CuNi, DIN 43710-1985

U: Cu-CuNi, DIN 43710-1985

W: W5Re/W26Re, ASTM E988-1990

JPt100: JIS C 1604-1989, JIS C 1606-1989

Pt100: JIS C 1604-1997, IEC 60751

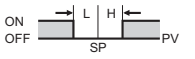
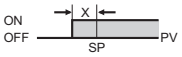
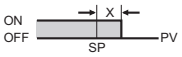
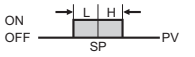
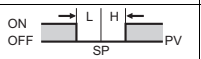
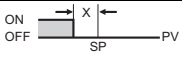
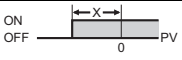
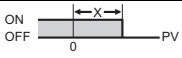
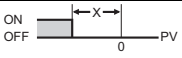
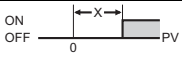
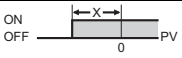
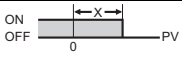
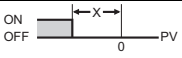
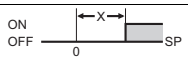
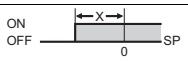
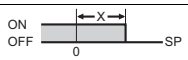
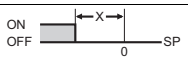
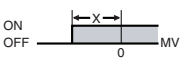
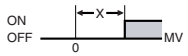
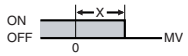
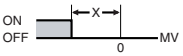
PL II: According to Platinel II electromotive force charts from BASF (previously Engelhard)

●Analog input

Input type	Current		Voltage		
Input specification	4 to 20 mA	0 to 20 mA	1 to 5 V	0 to 5 V	0 to 10 V
Setting range	Usable in the following ranges by scaling: -1999 to 9999, -199.9 to 999.9, -19.99 to 99.99 or -1.999 to 9.999				
Set value	25	26	27	28	29

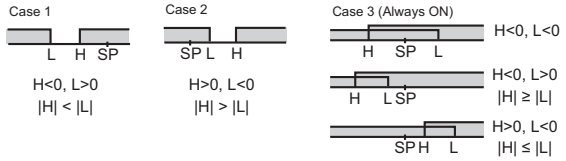
Alarm type

Each alarm can be independently set to one of the following 19 alarm types. The default is 2: Upper limit. (see note.)
Auxiliary outputs are allocated for alarms. ON delays and OFF delays (0 to 999 s) can also be specified.

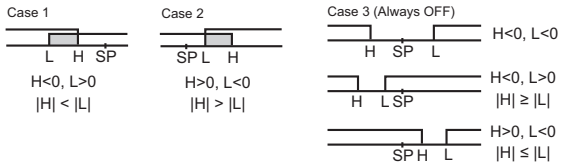
Set value	Alarm type	Alarm output operation		Description of function
		When alarm value X is positive	When alarm value X is negative	
0	Alarm function OFF	Output OFF		No alarm
1	Upper- and lower-limit *1		*2	Set the upward deviation in the set point for the alarm upper limit (H) and the lower deviation in the set point for the alarm lower limit (L). The alarm is ON when the PV is outside this deviation range.
2 (default)	Upper-limit			Set the upward deviation in the set point by setting the alarm value (X). The alarm is ON when the PV is higher than the SP by the deviation or more.
3	Lower-limit			Set the downward deviation in the set point by setting the alarm value (X). The alarm is ON when the PV is lower than the SP by the deviation or more.
4	Upper- and lower-limit range *1		*3	Set the upward deviation in the set point for the alarm upper limit (H) and the lower deviation in the set point for the alarm lower limit (L). The alarm is ON when the PV is inside this deviation range.
5	Upper- and lower-limit with standby sequence *1	*5 	*4	A standby sequence is added to the upper- and lower-limit alarm (1).*6
6	Upper-limit with standby sequence			A standby sequence is added to the upper-limit alarm (2). *6
7	Lower-limit with standby sequence			A standby sequence is added to the lower-limit alarm (3).*6
8	Absolute-value upper-limit			The alarm will turn ON if the process value is larger than the alarm value (X) regardless of the set point.
9	Absolute-value lower-limit			The alarm will turn ON if the process value is smaller than the alarm value (X) regardless of the set point.
10	Absolute-value upper-limit with standby sequence			A standby sequence is added to the absolute-value upper-limit alarm (8). *6
11	Absolute-value lower-limit with standby sequence			A standby sequence is added to the absolute-value lower-limit alarm (9). *6
12	LBA (alarm 1 type only)	-		*7
13	PV change rate alarm	-		*8
14	SP absolute value upper limit alarm			This alarm type turns ON the alarm when the set point (SP) is higher than the alarm value (X).
15	SP absolute value lower limit alarm			This alarm type turns ON the alarm when the set point (SP) is lower than the alarm value (X).
16	MV absolute value upper limit alarm *9	Standard Control	Standard Control 	This alarm type turns ON the alarm when the manipulated variable (MV) is higher than the alarm value (X).
		Heating/Cooling Control (Heating MV) 	Heating/Cooling Control (Heating MV) Always ON	
17	MV absolute value lower limit alarm *9	Standard Control 	Standard Control 	This alarm type turns ON the alarm when the manipulated variable (MV) is lower than the alarm value (X).
		Heating/Cooling Control (Cooling MV)	Heating/Cooling Control (Cooling MV) Always ON	

*1 With set values 1, 4 and 5, the upper and lower limit values can be set independently for each alarm type, and are expressed as “L” and “H.”

*2. Set value: 1, Upper- and lower-limit alarm



*3. Set value: 4, Upper- and lower-limit range



*4. Set value: 5, Upper- and lower-limit with standby sequence

For Upper- and Lower-Limit Alarm Described Above *2

- Case 1 and 2
  Always OFF when the upper-limit and lower-limit hysteresis overlaps.
- Case 3: Always OFF

*5. Set value: 5, Upper- and lower-limit with standby sequence
Always OFF when the upper-limit and lower-limit hysteresis overlaps.

*6. Refer to the E5□C Digital Temperature Controllers User's Manual (Cat. No. H174) for information on the operation of the standby sequence.

*7. Refer to the E5□C Digital Temperature Controllers User's Manual (Cat. No. H174) for information on the PV change rate alarm. This setting cannot be used with a position-proportional model.

*8. Refer to the E5□C Digital Temperature Controllers User's Manual (Cat. No. H174) for information on the PV change rate alarm.

*9. When heating/cooling control is performed, the MV absolute upper limit alarm functions only for the heating operation and the MV absolute lower limit alarm functions only for the cooling operation.

Characteristics

Indication accuracy (at the ambient temperature of 23°C)			Thermocouple: (±0.3% of PV or ±1°C, whichever is greater) ±1 digit max. *1 Platinum resistance thermometer: (±0.2% of PV or ±0.8°C, whichever is greater) ±1 digit Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max. Potentiometer input: ±5% FS ±1 digit max.
Influence of temperature *2			Thermocouple input (R, S, B, W, PL II): (±1% of PV or ±10°C, whichever is greater) ±1 digit max. Other thermocouple input: (±1% of PV or ±4°C, whichever is greater) ±1 digit max. *3 Platinum resistance thermometer: (±1% of PV or ±2°C, whichever is greater) ±1 digit max. Analog input: ±1%FS ±1 digit max. CT input: ±5% FS ±1 digit max.
Influence of voltage *2			
Influence of EMS. (at EN 61326-1)			
Input sampling period			50ms
Hysteresis			Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.01% to 99.99% FS (in units of 0.01% FS)
Proportional band (P)			Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.1 to 999.9% FS (in units of 0.1% FS)
Integral time (I)			Standard, heating/cooling, or Position-proportional (Close) 0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) Position-proportional (Floating) 1 to 9999 s (in units of 1 s), 0.1 to 999.9 s (in units of 0.1 s)
Derivative time (D)			0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *4
Proportional band (P) for cooling			Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.1 to 999.9% FS (in units of 0.1% FS)
Integral time (I) for cooling			0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *4
Derivative time (D) for cooling			0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *4
Control period			0.1, 0.2, 0.5, 1 to 99 s (in units of 1 s)
Manual reset value			0.0 to 100.0% (in units of 0.1%)
Alarm setting range			-1999 to 9999 (decimal point position depends on input type)
Affect of signal source resistance			Thermocouple: 0.1°C/Ω max. (100 Ω max.) Platinum resistance thermometer: 0.1°C/Ω max. (10 Ω max.)
Insulation resistance			20 MΩ min. (at 500 VDC)
Dielectric strength			2,300 VAC, 50/60 Hz for 1 min between terminals of different charge
Vibration	**Malfunction**		10 to 55 Hz, 20 m/s^2 for 10 min each in X, Y, and Z directions
	Resistance		10 to 55 Hz, 20 m/s^2 for 2 hrs each in X, Y, and Z directions
Shock	**Malfunction**		100 m/s^2, 3 times each in X, Y, and Z directions
	Resistance		300 m/s^2, 3 times each in X, Y, and Z directions
Weight		**E5EC-800**	Controller: Approx. 210 g, Mounting Brackets: Approx. 4 g × 2
		E5AC-800	Controller: Approx. 250 g, Mounting Brackets: Approx. 4 g × 2
Degree of protection			Front panel: IP66, Rear case: IP20, Terminals: IP00
Memory protection			Non-volatile memory (number of writes: 1,000,000 times)
Standards	**Approved standards**		UL 61010-1, Korean Radio Waves Act (Act 10564)
	Conformed standards		EN 61010-1 (IEC 61010-1): Pollution level 2, overcurrent category II, Lloyd's standards *5
EMC			EMI: EN 61326-1 *6 Radiated Interference Electromagnetic Field Strength: EN 55011 Group 1, class A Noise Terminal Voltage: EN 55011 Group 1, class A EMS: EN 61326-1 *6 ESD Immunity: EN 61000-4-2 Electromagnetic Field Immunity: EN 61000-4-3 Burst Noise Immunity: EN 61000-4-4 Conducted Disturbance Immunity: EN 61000-4-6 Surge Immunity: EN 61000-4-5 Voltage Dip/Interrupting Immunity: EN 61000-4-11

*1. The indication accuracy of K thermocouples in the -200 to 1300°C range, T and N thermocouples at a temperature of -100°C max., and U and L thermocouples at any temperatures is ±2°C ±1 digit max. The indication accuracy of the B thermocouple at a temperature of 400°C max. is not specified. The indication accuracy of B thermocouples at a temperature of 400 to 800°C is ±3°C max. The indication accuracy of the R and S thermocouples at a temperature of 200°C max. is ±3°C ±1 digit max. The indication accuracy of W thermocouples is (±0.3 of PV or ±3°C, whichever is greater) ±1 digit max. The indication accuracy of PL II thermocouples is (±0.3% of PV or ±2°C, whichever is greater) ±1 digit max.
*2. Ambient temperature: -10°C to 23°C to 55°C, Voltage range: -15% to 10% of rated voltage
*3. K thermocouple at -100°C max.: ±10°C max.
*4. The unit is determined by the setting of the Integral/Derivative Time Unit parameter.
*5. Refer to information on maritime standards in *Shipping Standards* on page 52 for compliance with Lloyd's Standards.
*6. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

Communications Specifications

Transmission line connection method	RS-485: Multidrop
Communications	RS-485 (two-wire, half duplex)
Synchronization method	Start-stop synchronization
Protocol	CompoWay/F, or Modbus
Baud rate	9600, 19200, 38400, or 57600 bps
Transmission code	ASCII
Data bit length*	7 or 8 bits
Stop bit length*	1 or 2 bits
Error detection	Vertical parity (none, even, odd) Block check character (BCC) with CompoWay/F or CRC-16 Modbus
Flow control	None
Interface	RS-485
Retry function	None
Communications buffer	217 bytes
Communications response wait time	0 to 99 ms Default: 20 ms

* The baud rate, data bit length, stop bit length, and vertical parity can be individually set using the Communications Setting Level.

Communications Functions

Programless communications*1	You can use the memory in the PLC to read and write E5□C parameters, start and stop operation, etc. The E5□C automatically performs communications with PLCs. No communications programming is required. Number of connected Temperature Controllers: 32 max. (Up to 16 for the FX Series) Applicable PLCs OMRON PLCs CS Series, CJ Series, or CP Series Mitsubishi Electric PLCs MELSEC Q Series, L Series, or FX Series (compatible with the FX2 or FX3 (excluding the FX1S)) KEYENCE PLCs KEYENCE KV Series
Component Communications*1	When Digital Temperature Controllers are connected, set points and RUN/STOP commands can be sent from the Digital Temperature Controller that is set as the master to the Digital Temperature Controllers that are set as slaves. Slope and offsets can be set for the set point. Number of connected Digital Temperature Controllers: 32 max. (including master)
Copying*2	When Digital Temperature Controllers are connected, the parameters can be copied from the Digital Temperature Controller that is set as the master to the Digital Temperature Controllers that are set as slaves.

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KEYENCE is a registered trademark of Keyence Corporation.

*1 A Temperature Controller with version 1.1 or higher is required. A Temperature Controller with version 2.1 or higher is required for the FX Series or the KV Series.

*2 Both the programless communications and the component communications support the copying.

Current Transformer (Order Separately) Ratings

Dielectric strength	1,000 VAC for 1 min
Vibration resistance	50 Hz, 98 m/s^2
Weight	E54-CT1: Approx. 11.5 g, E54-CT3: Approx. 50 g
Accessories (E54-CT3 only)	Armatures (2) Plugs (2)

Heater Burnout Alarms and SSR Failure Alarms

CT input (for heater current detection)	Models with detection for single-phase heaters: One input Models with detection for single-phase or three-phase heaters: Two inputs
Maximum heater current	50 A AC
Input current indication accuracy	±5% FS ±1 digit max.
Heater burnout alarm setting range *1	0.1 to 49.9 A (in units of 0.1 A) Minimum detection ON time: 100 ms *3
SSR failure alarm setting range *2	0.1 to 49.9 A (in units of 0.1 A) Minimum detection OFF time: 100 ms *4

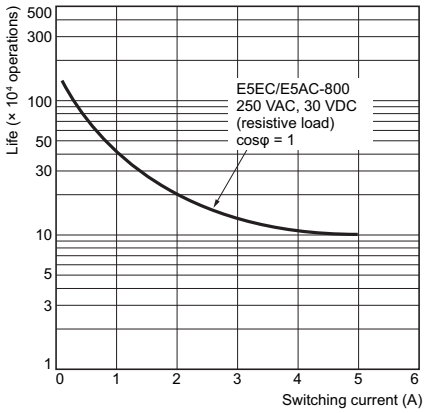
*1. For heater burnout alarms, the heater current will be measured when the control output is ON, and the output will turn ON if the heater current is lower than the set value (i.e., heater burnout detection current value).

*2. For SSR failure alarms, the heater current will be measured when the control output is OFF, and the output will turn ON if the heater current is higher than the set value (i.e., SSR failure detection current value).

*3. The value is 30 ms for a control period of 0.1 s or 0.2 s.

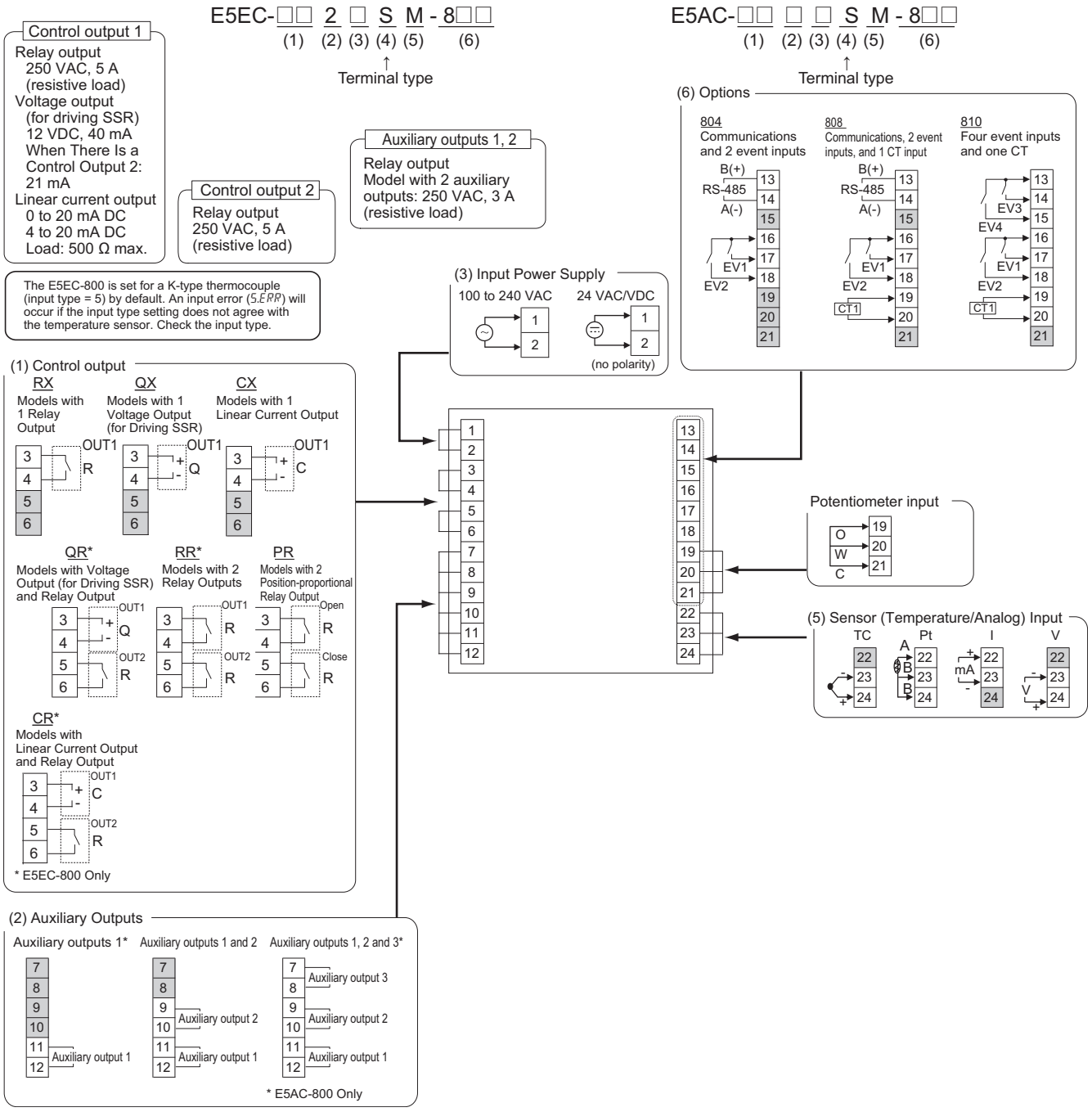
*4. The value is 35 ms for a control period of 0.1 s or 0.2 s.

Electrical Life Expectancy Curve for Relays (Reference Values)



External Connections

E5EC/E5AC-800



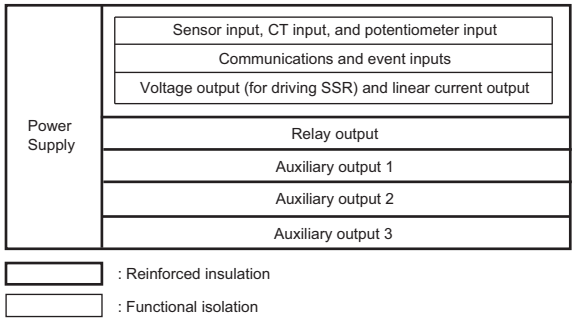
Note: 1. The application of the terminals depends on the model.

2. Do not wire the terminals that are shown with a gray background.

3. When complying with EMC standards, the cable that connects the sensor must be 30 m or less. If the cable length exceeds 30 m, compliance with EMC standards will not be possible.

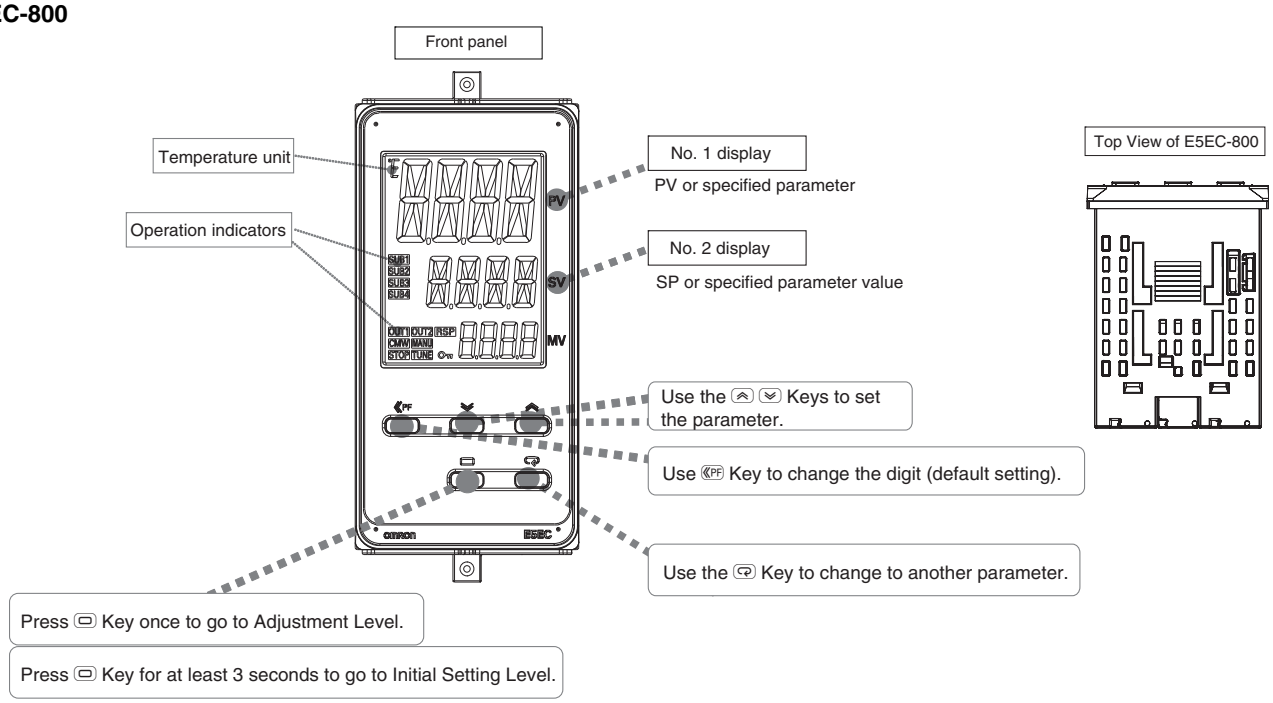
4. Connect M3 crimped terminals.

Isolation/Insulation Block Diagrams

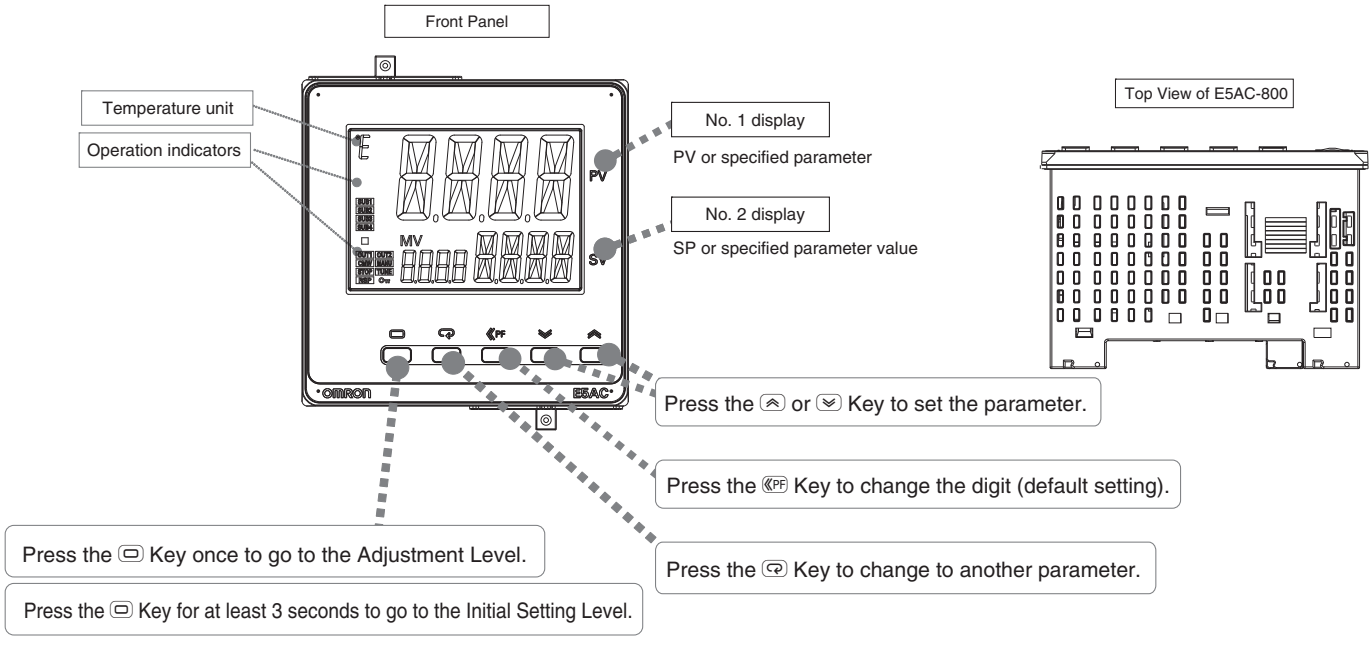


Nomenclature

E5EC-800


Front panel
Temperature unit
Operation indicators
No. 1 display
PV or specified parameter
No. 2 display
SP or specified parameter value
Top View of E5EC-800
Use the ▲ ▼ Keys to set the parameter.
Use PF Key to change the digit (default setting).
Use the R/S Key to change to another parameter.
Press MODE Key once to go to Adjustment Level.
Press MODE Key for at least 3 seconds to go to Initial Setting Level.

E5AC-800

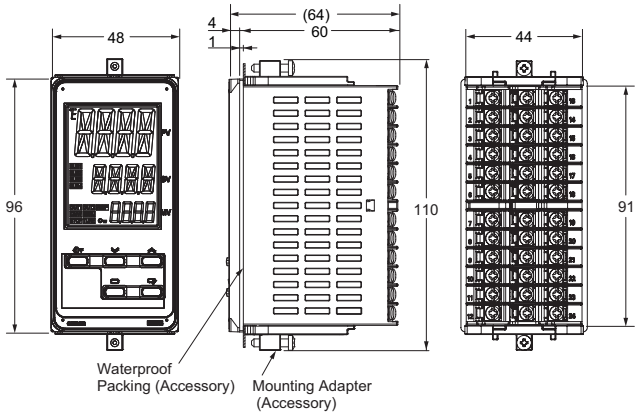

Front Panel
Temperature unit
Operation indicators
No. 1 display
PV or specified parameter
No. 2 display
SP or specified parameter value
Top View of E5AC-800
Press the ▲ or ▼ Key to set the parameter.
Press the PF Key to change the digit (default setting).
Press the R/S Key to change to another parameter.
Press the MODE Key once to go to the Adjustment Level.
Press the MODE Key for at least 3 seconds to go to the Initial Setting Level.

Dimensions

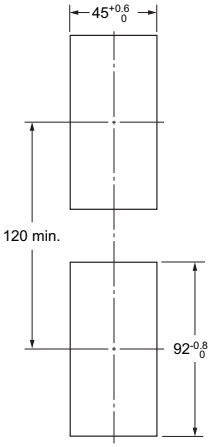
(Unit: mm)

Controllers

E5EC-800

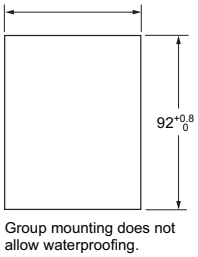


Mounted Separately



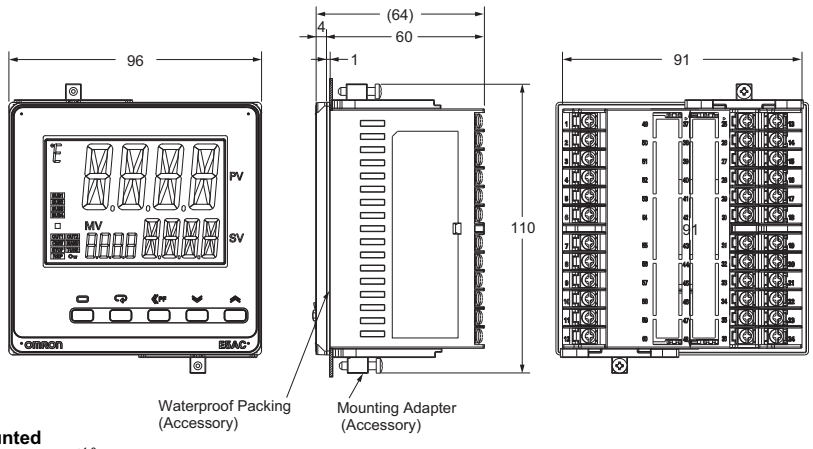
Group Mounted

(48 × number of units − 2.5) +1.0 0

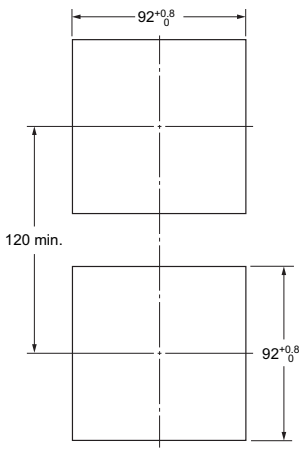


- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller.
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

E5AC-800

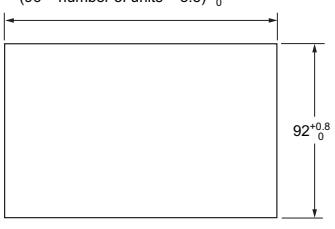


Mounted Separately



Group Mounted

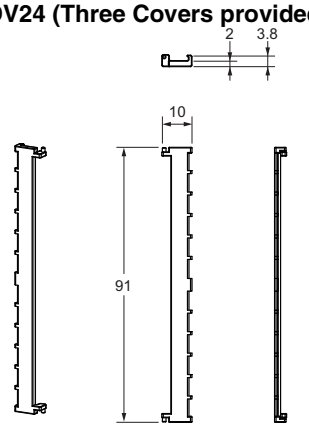
(96 × number of units − 3.5) +1.0 0



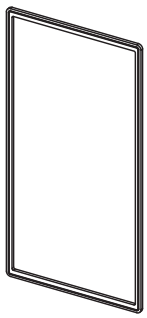
- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller.
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

Accessories (Order Separately)

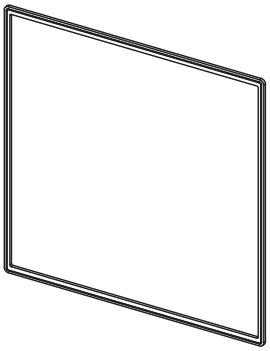
● **Terminal Covers**
E53-COV24 (Three Covers provided.)



● **Waterproof Packing**
Y92S-P9 (for DIN 48 × 96)
(Provided with the Controller.)

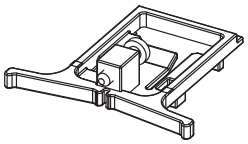


Y92S-P10 (for DIN 96 × 96)
(Provided with the Controller.)



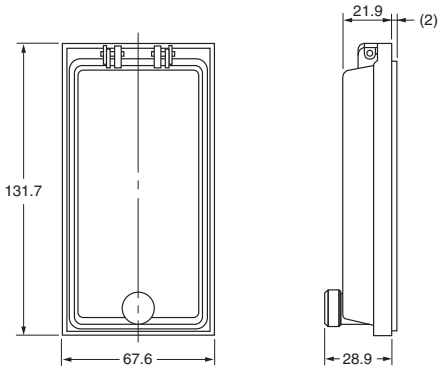
The Waterproof Packing is provided with the Temperature Controller.
The degree of protection when the Waterproof Packing is used is IP66.
Also, keep the Port Cover of the E5EC/E5AC-800 securely closed.
To maintain an IP66 degree of protection, the Waterproof Packing and the Port Cover must be periodically replaced because they may deteriorate, shrink, or harden depending on the operating environment.
The replacement period will vary with the operating environment.
Check the required period in the actual application. Use 3 years or sooner as a guideline.
If a waterproof structure is not required, then the Waterproof Packing does not need to be installed.

● **Mounting Adapter**
Y92F-51 (for DIN 48 × 96)
(Two Adapters provided.)

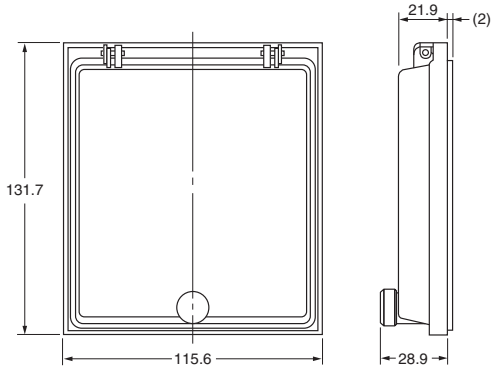


One pair is provided with the Controller.
Order this Adapter separately if it becomes lost or damaged.

● **Watertight Cover**
Y92A-49N (48 × 96)

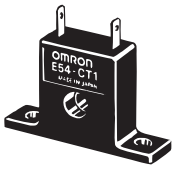


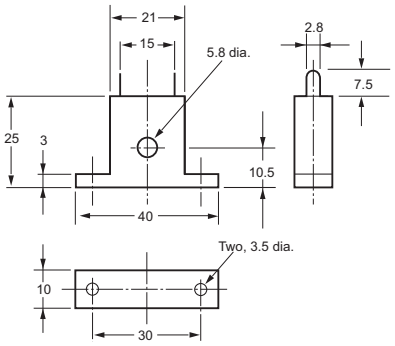
● **Watertight Cover**
Y92A-96N (96 × 96)



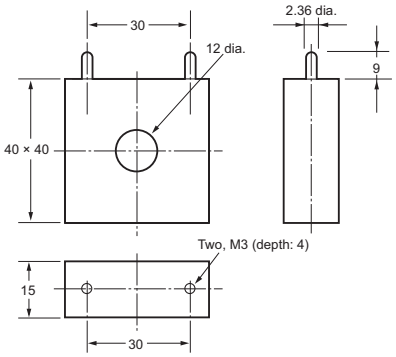
● Current Transformers

E54-CT1



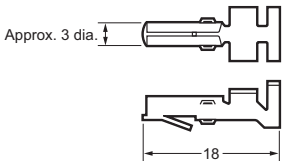


E54-CT3

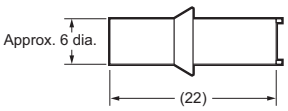


E54-CT3 Accessories

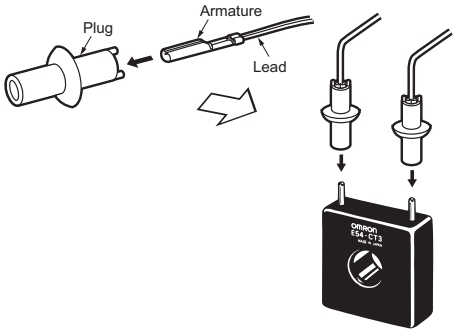
- **Armature**



- **Plug**

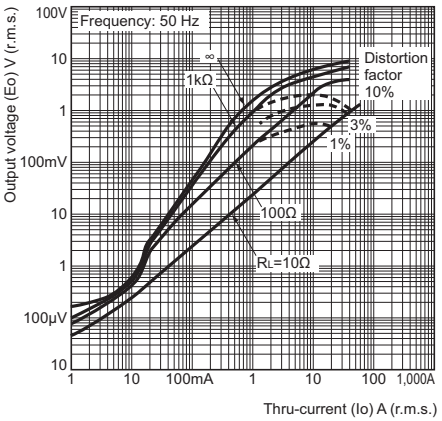


Connection Example



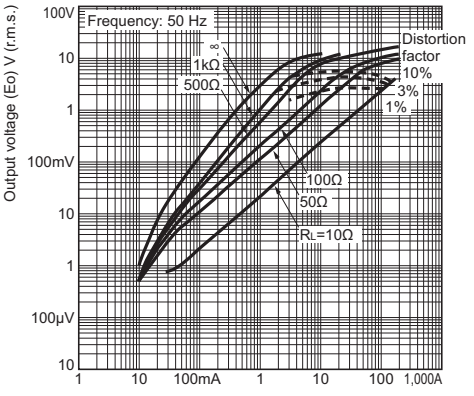
Thru-current (Io) vs. Output Voltage (Eo) (Reference Values)
E54-CT1

Maximum continuous heater current: 50 A (50/60 Hz)
Number of windings: 400±2
Winding resistance: 18±2 Ω



Thru-current (Io) vs. Output Voltage (Eo) (Reference Values)
E54-CT3

Maximum continuous heater current: 120 A (50/60 Hz)
(Maximum continuous heater current for an OMRON Digital Temperature Controller is 50 A.)
Number of windings: 400±2
Winding resistance: 8±0.8 Ω



Digital Temperature Controller
E5DC-800 (22.5 mm Wide, and DIN Track-mounting Type)

The E5DC-800 Mounts to DIN Track and Is Ideal for Connections to HMIs and PLCs. It provides the Same Easy Operation and Advanced Performance as the Rest of the E5□C-800 Series.

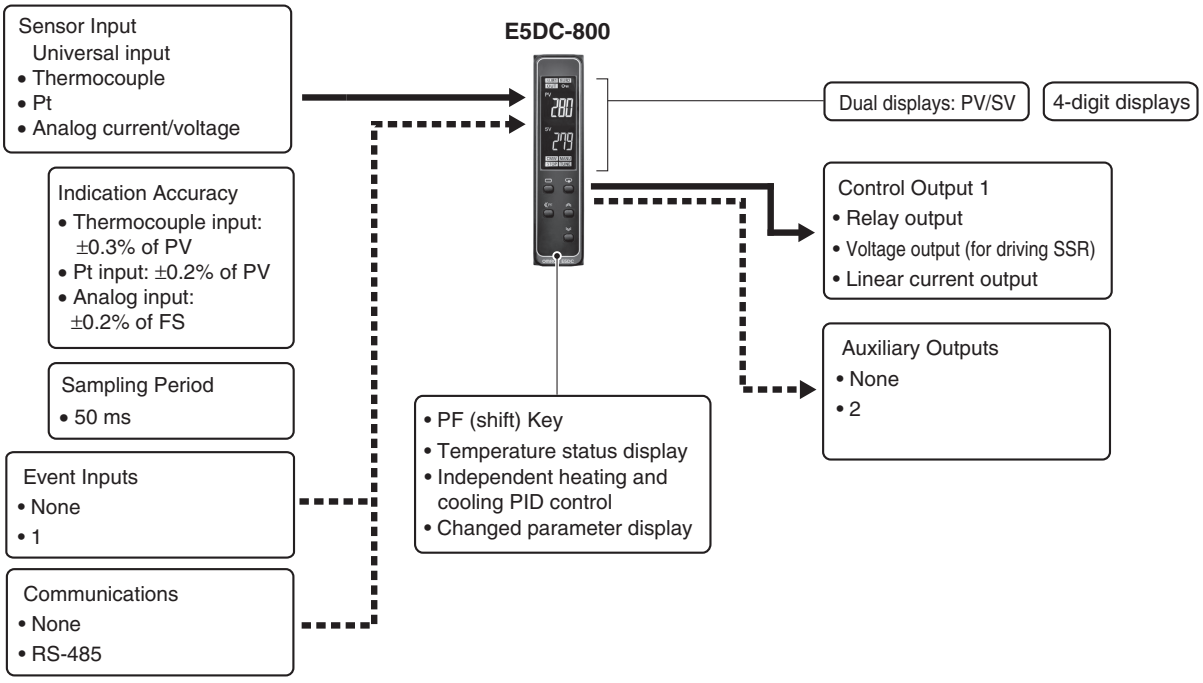
- A slim body at 85 × 22.5 mm (D × W) that fits into narrow control panels and mounts to DIN Track.
- Removable terminal block for easy replacement to simplify maintenance.
- High-speed sampling at 50 ms for applications with high-speed temperature increases.
- Easy connections to a PLC with programless communications.
- Models are available with up to 2 auxiliary outputs and 1 event input to complete basic functions.
- A white PV display (height: 8.5 mm) is easy to read when setting up, checking alarms, and making settings in a control panel.

22.5 mm Wide, and DIN Track-mounting Type E5DC-800

Refer to your OMRON website for the most recent information on applicable safety standards.

⚠ **Refer to *Safety Precautions* on page 50.**

Main I/O Functions



Model Number Legend and Standard Models

Model Number Legend

●Models with Screw Terminals

E5DC-800 22.5 × 96 mm

Control output	Auxiliary output	Communications	Heater burnot	Event inputs	Power supply voltage	Model *2
Relay output	---	RS-485	---	---	100 to 240 VAC	E5DC-RX0ASM-815
						E5DC-RX0AUM-815
Voltage output						E5DC-QX0ASM-815
						E5DC-QX0AUM-815
Linear current output *1						E5DC-CX0ASM-815
						E5DC-CX0AUM-815
Relay output					24 VAC/VDC	E5DC-RX0DSM-815
						E5DC-RX0DUM-815
Voltage output						E5DC-QX0DSM-815
						E5DC-QX0DUM-815
Linear current output *1						E5DC-CX0DSM-815
						E5DC-CX0DUM-815
Relay output	Two	---			100 to 240 VAC	E5DC-RX2ASM-800
						E5DC-RX2AUM-800
Voltage output						E5DC-QX2ASM-800
						E5DC-QX2AUM-800
Linear current output *1						E5DC-CX2ASM-800
						E5DC-CX2AUM-800
Relay output					24 VAC/VDC	E5DC-RX2DSM-800
						E5DC-RX2DUM-800
Voltage output						E5DC-QX2DSM-800
						E5DC-QX2DUM-800
Linear current output *1						E5DC-CX2DSM-800
						E5DC-CX2DUM-800
Relay output		RS-485	Detection for Single-phase heater		100 to 240 VAC	E5DC-RX2ASM-802
						E5DC-RX2AUM-802
Voltage output						E5DC-QX2ASM-802
						E5DC-QX2AUM-802
Linear current output *1			---			E5DC-CX2ASM-815
						E5DC-CX2AUM-815
Relay output			Detection for Single-phase heater		24 VAC/VDC	E5DC-RX2DSM-802
						E5DC-RX2DUM-802
Voltage output						E5DC-QX2DSM-802
						E5DC-QX2DUM-802
Linear current output *1			---			E5DC-CX2DSM-815
						E5DC-CX2DUM-815
Relay output		---	Detection for Single-phase heater	One	100 to 240 VAC	E5DC-RX2ASM-817
						E5DC-RX2AUM-817
Voltage output						E5DC-QX2ASM-817
						E5DC-QX2AUM-817
Linear current output *1			---			E5DC-CX2ASM-816
						E5DC-CX2AUM-816
Relay output			Detection for Single-phase heater		24 VAC/VDC	E5DC-RX2DSM-817
						E5DC-RX2DUM-817
Voltage output						E5DC-QX2DSM-817
						E5DC-QX2DUM-817
Linear current output *1			---			E5DC-CX2DSM-816
						E5DC-CX2DUM-816

*1 The control output can be used as a simple transfer output for the Digital Temperature Controllers manufactured in July 2014 or later.

*2 Option 000 can be selected only if two auxiliary outputs are selected.
Options 002 and 017 can be selected only if the control output is a relay output or voltage output and two auxiliary outputs are selected.
Option 015 cannot be selected if the control output is a relay output or voltage output and two auxiliary outputs are selected.
Options 016 can be selected only if the control output is a linear current output and two auxiliary outputs are selected.

Heating and Cooling Control

●Using Heating and Cooling Control

① Control Output Assignment
An auxiliary output is used as the cooling control output.
② Control
If PID control is used, you can set PID control separately for heating and cooling.
This allows you to handle control systems with different heating and cooling response characteristics.

Optional Products (Order Separately)

Terminal Unit

Model
E5DC-SCT1S

Current Transformers (CTs)

Hole diameter	Model
5.8 mm	E54-CT1
12.0 mm	E54-CT3

Mounting Adapters

Model
Y92F-53

Short Bars

Model
Y92S-P11

End Plate

Model
PFP-M

Spacer

Model
PFP-S

DIN Tracks

Model
PFP-100N
PFP-50N

Unit Labels

Model
Y92S-L2

End Cover

Model
Y92F-54

E5DC-800

Specifications

Ratings

Power supply voltage		A in model number: 100 to 240 VAC, 50/60 Hz D in model number: 24 VAC, 50/60 Hz; 24 VDC
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		4.9 VA max. at 100 to 240 VAC, and 2.8 VA max. at 24 VDC or 1.5 W max. at 24 VDC
Sensor input		Temperature input Thermocouple: K, J, T, E, L, U, N, R, S, B, W, or PL II Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor (ES1B): 10 to 70°C, 60 to 120°C, 115 to 165°C, or 140 to 260°C Analog input Current input: 4 to 20 mA or 0 to 20 mA Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V
Input impedance		Current input: 150 Ω max., Voltage input: 1 MΩ min. (Use a 1:1 connection when connecting the ES2-HB/THB.)
Control method		ON/OFF control or 2-PID control (with auto-tuning)
Control output	**Relay output**	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
	Voltage output (for driving SSR)	Output voltage 12 VDC ±20% (PNP), max. Load current: 21 mA, with short-circuit protection circuit
	Linear current output	4 to 20 mA DC/0 to 20 mA DC, load: 500 Ω max., resolution: Approx. 10,000
Auxiliary outputs	**Number of outputs**	2 (depends on model)
	Output specifications	SPST-NO relay outputs: 250 VAC, 2 A (resistive load), Electrical life: 100,000 operations, Minimum applicable load: 10 mA at 5 V
Event inputs	**Number of inputs**	1 (depends on model)
	External contact input specifications	Contact input ON: 1 kΩ max., OFF: 100 kΩ min.
		Non-contact input ON: Residual voltage 1.5 V max.; OFF: Leakage current 0.1 mA max.
		Current flow: approx. 7 mA per contact
Setting method		Digital setting using front panel keys
Indication method		11-segment digital displays and individual indicators Character height: PV: 8.5 mm, SV: 8.0 mm
Multi SP		Up to eight set points (SP0 to SP7) can be saved and selected using the event inputs, key operations, or serial communications.*1
Bank switching		None
Other functions		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout (HB) alarm (including SSR failure (HS) alarm), 40% AT, 100% AT, MV limiter, input digital filter, self tuning, PV input shift, run/stop, protection functions, temperature status display, moving average of input value, simple transfer output,*2 and work bit message*2
Ambient operating temperature		−10 to 55°C (with no condensation or icing), for 3-year warranty: −10 to 50°C (with no condensation or icing)
Ambient operating humidity		25% to 85%
Storage temperature		−25 to 65°C (with no condensation or icing)
Altitude		2,000 m max.
Recommended fuse		T2A, 250 VAC, time lag, low shut-off capacity
Installation environment		Installation Category II, Pollution Class 2 (IEC 61010-1 compliant)

*1 Only two set points are selectable for event inputs.
*2 Usage is possible for the Digital Temperature Controllers manufactured in July 2014 or later.

Input Ranges

●Thermocouple/Platinum Resistance Thermometer (Universal inputs)

Sensor type	Platinum resistance thermometer					Thermocouple															Infrared temperature sensor			
Sensor specification	Pt100			JPt100		K		J		T		E	L	U		N	R	S	B	W	PLII	10 to 70°C	60 to 120°C	115 to 165°C	140 to 260°C
Temperature range (°C)	850	500.0	100.0 / 0.0	500.0	100.0 / 0.0	1300 / -200	500.0 / -20.0	850 / -100	400.0 / -20.0	400 / -200	400.0 / -199.9	600 / -200	850 / -100	400 / -200	400.0 / -199.9	1300 / -200	1700 / 0	1700 / 0	1800 / 100	2300 / 0	1300 / 0	90 / 0	120 / 0	165 / 0	260 / 0
Set value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Shaded settings are the default settings.

The applicable standards for the input types are as follows:

K, J, T, E, N, R, S, B: JIS C 1602-1995, IEC 60584-1

L: Fe-CuNi, DIN 43710-1985

U: Cu-CuNi, DIN 43710-1985

W: W5Re/W26Re, ASTM E988-1990

JPt100: JIS C 1604-1989, JIS C 1606-1989

Pt100: JIS C 1604-1997, IEC 60751

PL II: According to Platinel II electromotive force charts from BASF (previously Engelhard)

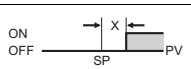
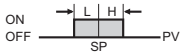
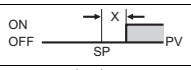
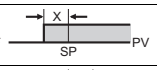
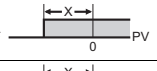
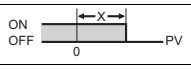
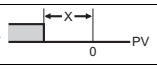
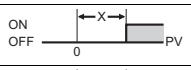
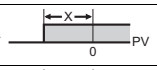
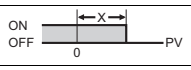
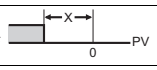
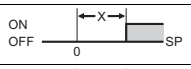
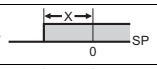
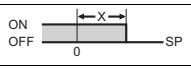
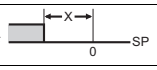
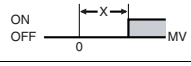
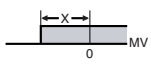
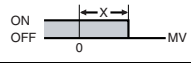
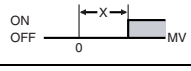
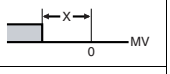
●Analog input

Input type	Current		Voltage		
Input specification	4 to 20 mA	0 to 20 mA	1 to 5 V	0 to 5 V	0 to 10 V
Setting range	Usable in the following ranges by scaling: -1999 to 9999, -199.9 to 999.9, -19.99 to 99.99 or -1.999 to 9.999				
Set value	25	26	27	28	29

Alarm Types

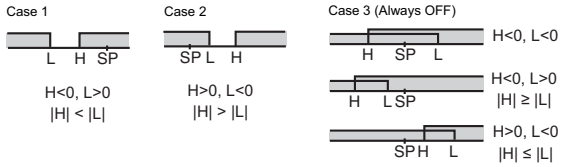
Each alarm can be independently set to one of the following 17 alarm types. The default is 2: Upper limit. (See note.)
Auxiliary outputs are allocated to alarms. ON delays and OFF delays (0 to 999 s) can also be specified.

Note: In the default settings for models with HB or HS alarms, alarm 1 is set to a heater alarm (HA) and the Alarm Type 1 parameter is not displayed.
To use alarm 1, set the output assignment to alarm 1.

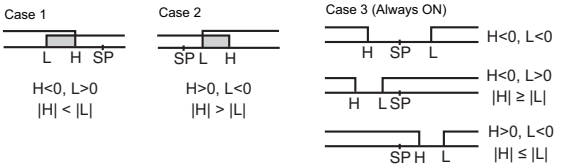
Set value	Alarm type	Alarm output operation		Description of function
		When alarm value X is positive	When alarm value X is negative	
0	Alarm function OFF	Output OFF		No alarm
1	Upper- and lower-limit *1		*2	Set the upward deviation in the set point for the alarm upper limit (H) and the lower deviation in the set point for the alarm lower limit (L). The alarm is ON when the PV is outside this deviation range.
2 (default)	Upper-limit			Set the upward deviation in the set point by setting the alarm value (X). The alarm is ON when the PV is higher than the SP by the deviation or more.
3	Lower-limit			Set the downward deviation in the set point by setting the alarm value (X). The alarm is ON when the PV is lower than the SP by the deviation or more.
4	Upper- and lower-limit range *1		*3	Set the upward deviation in the set point for the alarm upper limit (H) and the lower deviation in the set point for the alarm lower limit (L). The alarm is ON when the PV is inside this deviation range.
5	Upper- and lower-limit with standby sequence *1 *5		*4	A standby sequence is added to the upper- and lower-limit alarm (1). *6
6	Upper-limit with standby sequence			A standby sequence is added to the upper-limit alarm (2). *6
7	Lower-limit with standby sequence			A standby sequence is added to the lower-limit alarm (3). *6
8	Absolute-value upper-limit			The alarm will turn ON if the process value is larger than the alarm value (X) regardless of the set point.
9	Absolute-value lower-limit			The alarm will turn ON if the process value is smaller than the alarm value (X) regardless of the set point.
10	Absolute-value upper-limit with standby sequence			A standby sequence is added to the absolute-value upper-limit alarm (8). *6
11	Absolute-value lower-limit with standby sequence			A standby sequence is added to the absolute-value lower-limit alarm (9). *6
12	LBA (alarm 1 type only)	-		*7
13	PV change rate alarm	-		*8
14	SP absolute-value upper-limit alarm			This alarm type turns ON the alarm when the set point (SP) is higher than the alarm value (X).
15	SP absolute-value lower-limit alarm			This alarm type turns ON the alarm when the set point (SP) is lower than the alarm value (X).
16	MV absolute-value upper-limit alarm *9	Standard Control Heating/Cooling Control (Heating MV) 	Standard Control  Heating/Cooling Control (Heating MV) Always ON	This alarm type turns ON the alarm when the manipulated variable (MV) is higher than the alarm value (X).
17	MV absolute-value lower-limit alarm *9	Standard Control  Heating/Cooling Control (Cooling MV) 	Standard Control  Heating/Cooling Control (Cooling MV) Always ON	This alarm type turns ON the alarm when the manipulated variable (MV) is lower than the alarm value (X).

*1 With set values 1, 4, and 5, the upper- and lower-limit values can be set independently for each alarm type, and are expressed as “L” and “H.”

*2 Set value: 1, Upper- and lower-limit alarm



*3 Set value: 4, Upper- and lower-limit range



*4 Set value: 5, Upper- and lower-limit with standby sequence
For Upper- and Lower-Limit Alarm Described Above at *2
- In cases 1 and 2 above, the alarm is always OFF if the upper- and lower-limit hysteresis overlaps.
- In case 3, the alarm is always OFF.

*5 Set value: 5, Upper- and lower-limit alarm with standby sequence
The alarm is always OFF if upper- and lower-limit hysteresis overlaps.

*6 Refer to the *E5□C Digital Temperature Controllers User’s Manual* (Cat. No. H174) for information on the operation of the standby sequence.

*7 Refer to the *E5□C Digital Temperature Controllers User’s Manual* (Cat. No. H174) for information on the LBA.

*8 Refer to the *E5□C Digital Temperature Controllers User’s Manual* (Cat. No. H174) for information on the PV change rate alarm.

*9 When heating/cooling control is performed, the MV absolute-value upper-limit alarm functions only for the heating operation and the MV absolute-value lower-limit alarm functions only for the cooling operation.

Characteristics

Indication accuracy (when mounted individually, ambient temperature of 23°C)		Thermocouple:*1 (±0.3 % of PV or ±1°C, whichever is greater) ±1 digit max. Platinum resistance thermometer: (±0.2 % of PV or ±0.8°C, whichever is greater) ±1 digit max. Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max.
Simple transfer output accuracy		±0.3% FS max.*2
Influence of temperature *3		Thermocouple input (R, S, B, W, PL II): (±1% of PV or ±10°C, whichever is greater) ±1 digit max. Other thermocouple input: (±1% of PV or ±4°C, whichever is greater) ±1 digit max. *4 Platinum resistance thermometer: (±1% of PV or ±2°C, whichever is greater) ±1 digit max. Analog input: ±1% FS ±1 digit max. CT input: ±5% FS ±1 digit max.
Influence of voltage *3		
Influence of EMS. (at EN 61326-1)		
Installation influence (E5DC-800 only)		R, S, B, W, or PLII thermocouple: (±1% of PV or ±10°C, whichever is greater) ±1 digit max. Other thermocouple: (±1% of PV or ±4°C, whichever is greater) ±1 digit max. *4
Input sampling period		50 ms
Hysteresis		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.01% to 99.99% FS (in units of 0.01% FS)
Proportional band (P)		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.1% to 999.9% FS (in units of 0.1% FS)
Integral time (I)		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
Derivative time (D)		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
Proportional band (P) for cooling		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.1% to 999.9% FS (in units of 0.1% FS)
Integral time (I) for cooling		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
Derivative time (D) for cooling		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
Control period		0.1, 0.2, 0.5, 1 to 99 s (in units of 1 s)
Manual reset value		0.0% to 100.0% (in units of 0.1%)
Alarm setting range		−1,999 to 9,999 (decimal point position depends on input type)
Influence of signal source resistance		Thermocouple: 0.1°C/Ω max. (100 Ω max.), Platinum resistance thermometer: 0.1°C/Ω max. (10 Ω max.)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		2,300 VAC, 50/60 Hz for 1 min between terminals of different charge
Vibration	**Malfunction**	10 to 55 Hz, 20 m/s² for 10 min each in X, Y and Z directions
	Resistance	10 to 55 Hz, 20 m/s² for 2 hr each in X, Y, and Z directions
Shock	**Malfunction**	100 m/s², 3 times each in X, Y, and Z directions
	Resistance	300 m/s², 3 times each in X, Y, and Z directions
Weight		Controller: Approx. 120 g
Degree of protection		Main unit: IP20, Terminal unit: IP00
Memory protection		Non-volatile memory (number of writes: 1,000,000 times)
Standards	**Approved standards**	UL 61010-1, Korean Radio Waves Act (Act 10564)
	Conformed standards	EN 61010-1 (IEC 61010-1): Pollution level 2, overcurrent category II, Lloyd's standards *6
EMC		EMI: EN61326-1 *7 Radiated Interference Electromagnetic Field Strength: EN55011 Group 1, class A Noise Terminal Voltage: EN55011 Group 1, class A EMS: EN61326-1 *7 ESD Immunity: EN61000-4-2 Electromagnetic Field Immunity: EN61000-4-3 Burst Noise Immunity: EN61000-4-4 Conduction Disturbance Immunity: EN61000-4-6 Surge Immunity: EN61000-4-5 Voltage Dip/Interrupting Immunity: EN61000-4-11

*1 The indication accuracy of K thermocouples in the −200 to 1,300°C range, T and N thermocouples at a temperature of −100°C or less, and U and L thermocouples at any temperature is ±2°C ±1 digit max. The indication accuracy of B thermocouples at a temperature of 400°C max. is not specified. The indication accuracy of B thermocouples at a temperature of 400 to 800°C is ±3°C max.
The indication accuracy of R and S thermocouples at a temperature of 200°C max. is ±3°C ±1 digit max. The indication accuracy of W thermocouples is (±0.3% of PV or ±3°C, whichever is greater) ±1 digit max.
The indication accuracy of PLII thermocouples is (±0.3% of PV or ±2°C, whichever is greater) ±1 digit max.
*2 However, the precision between 0 and 4 mA for a 0 to 20 mA output is ±1% FS max.
*3 Ambient temperature: −10 to 23 to 55°C, Voltage range: −15% to 10% of rated voltage
*4 K thermocouple at −100°C max: ±10°C max.
*5 The unit is determined by the setting of the Integral/Derivative Time Unit parameter.
*6 Refer to information on maritime standards in *Shipping Standards* on page 106 for compliance with Lloyd's Standards.
*7 Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

Communications Specifications

Transmission line connection method	RS-485: Multidrop
Communications	RS-485 (two-wire, half-duplex)
Synchronization method	Start-stop synchronization
Protocol	CompoWay/F or Modbus
Baud rate	9,600, 19,200, 38,400, or 57,600 bps
Transmission code	ASCII
Data bit length *	7 or 8 bits
Stop bit length *	1 or 2 bits
Error detection	Vertical parity (none, even, or odd) Block check character (BCC) with CompoWay/F or CRC-16 with Modbus
Flow control	None
Interface	RS-485
Retry function	None
Communications buffer	217 bytes
Communications response wait time	0 to 99 ms Default: 20 ms

* The baud rate, data bit length, stop bit length, and vertical parity can be individually set using the Communications Setting Level.

Communications Functions

Programless communications *1	You can use the memory in the PLC to read and write E5□C parameters, start and stop operation, etc. The E5□C automatically performs communications with the PLC. No communications programming is required. Number of connected Digital Temperature Controllers: 32 max. (Up to 16 for the FX Series) Applicable PLCs: OMRON PLCs CS Series, CJ Series, or CP Series Mitsubishi Electric PLCs MELSEC Q Series, L Series, or FX Series (compatible with the FX2 or FX3 (excluding the FX1S)) KEYENCE PLCs KEYENCE KV Series
Component Communications *1	When Digital Temperature Controllers are connected, set points and RUN/STOP commands can be sent from the Digital Temperature Controller that is set as the master to the Digital Temperature Controllers that are set as slaves. Slope and offsets can be set for the set point. Number of connected Digital Temperature Controllers: 32 max. (including master)
Copying *2	When Digital Temperature Controllers are connected, the parameters can be copied from the Digital Temperature Controller that is set as the master to the Digital Temperature Controllers that are set as slaves.

MELSEC is a registered trademark of Mitsubishi Electric Corporation.

KEYENCE is a registered trademark of Keyence Corporation.

*1 A Temperature Controller with version 2.1 or higher is required for the FX Series or the KV Series.

*2 Both the programless communications and the component communications support the copying.

Current Transformer (Order Separately) Ratings

Dielectric strength	1,000 VAC for 1 min
Vibration resistance	50 Hz, 98 m/s^2
Weight	E54-CT1: Approx. 11.5 g, E54-CT3: Approx. 50 g
Accessories (E54-CT3 only)	Armatures (2) Plugs (2)

Heater Burnout Alarms and SSR Failure Alarms

CT input (for heater current detection)	Models with detection for single-phase heaters: 1 input
Maximum heater current	50 A AC
Input current indication accuracy	±5% FS ±1 digit max.
Heater burnout alarm setting range *1	0.1 to 49.9 A (in units of 0.1 A) Minimum detection ON time: 100 ms *3
SSR failure alarm setting range *2	0.1 to 49.9 A (in units of 0.1 A) Minimum detection OFF time: 100 ms *4

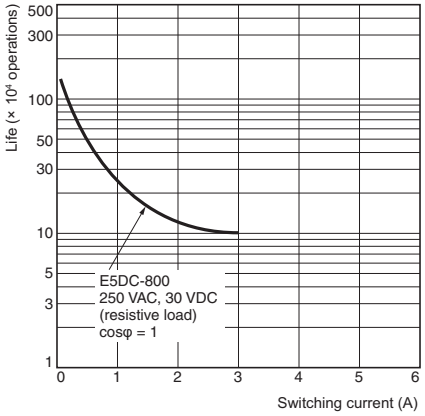
*1 For heater burnout alarms, the heater current will be measured when the control output is ON, and the output will turn ON if the heater current is lower than the set value (i.e., heater burnout detection current value).

*2 For SSR failure alarms, the heater current will be measured when the control output is OFF, and the output will turn ON if the heater current is higher than the set value (i.e., SSR failure detection current value).

*3 The value is 30 ms for a control period of 0.1 s or 0.2 s.

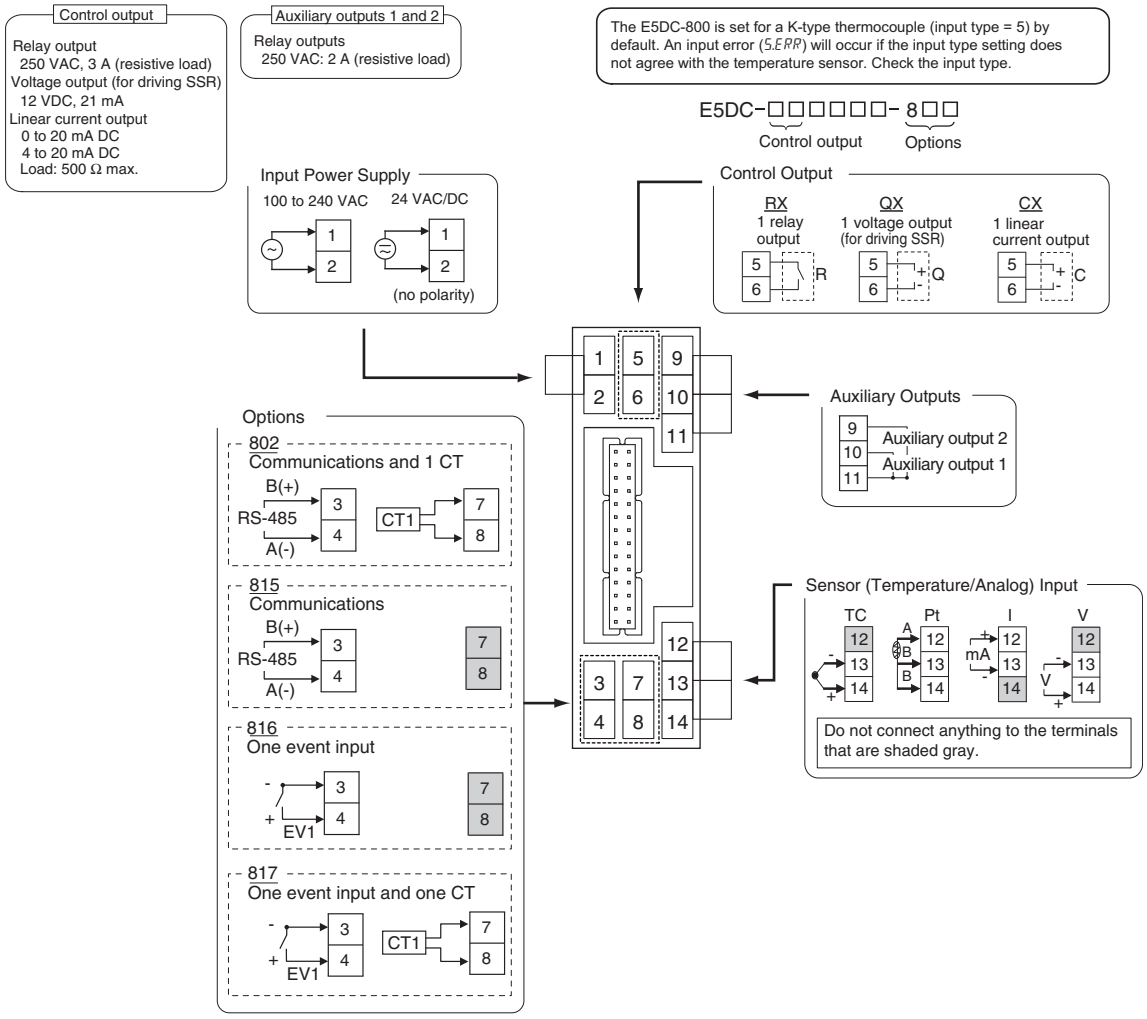
*4 The value is 35 ms for a control period of 0.1 s or 0.2 s.

Electrical Life Expectancy Curve for Control Output Relay (Reference Values)



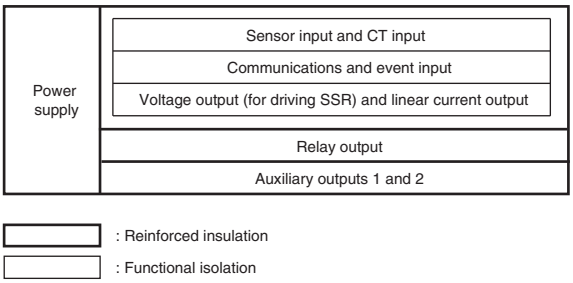
External Connections

E5DC-800



Note: 1. The application of the terminals depends on the model.
2. Do not wire the terminals that are shown with a gray background.
3. When complying with EMC standards, the cable that connects the sensor must be 30 m or less. If the cable length exceeds 30m, compliance with EMC standards will not be possible.
4. Connect M3 crimped terminals.

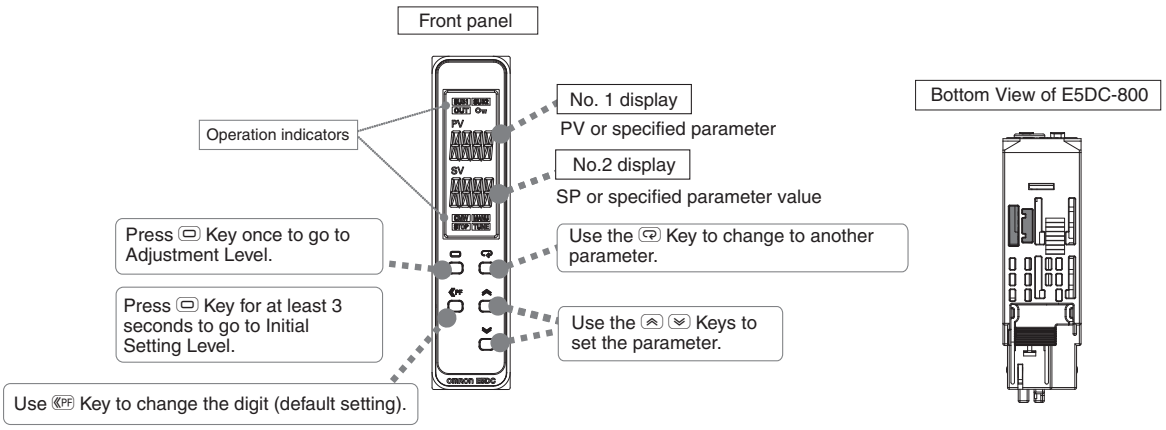
Isolation/Insulation Block Diagrams


Power supply
Sensor input and CT input
Communications and event input
Voltage output (for driving SSR) and linear current output
Relay output
Auxiliary outputs 1 and 2
: Reinforced insulation
: Functional isolation

Note: Auxiliary outputs 1 and 2 are not insulated.

Nomenclature

E5DC-800


Front panel
Operation indicators
No. 1 display
PV or specified parameter
No.2 display
SP or specified parameter value
Press Key once to go to Adjustment Level.
Use the Key to change to another parameter.
Press Key for at least 3 seconds to go to Initial Setting Level.
Use the Keys to set the parameter.
Use Key to change the digit (default setting).
Bottom View of E5DC-800

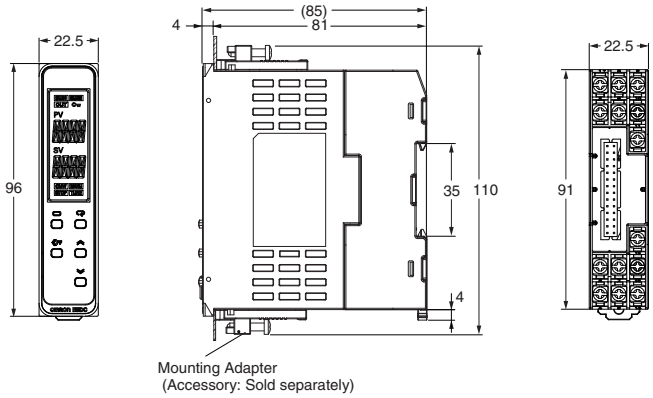
Dimensions

(Unit: mm)

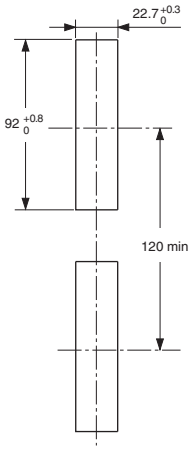
Controllers

E5DC-800

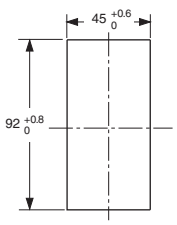
The above figure shows the Terminal Unit attached to the Main Unit.



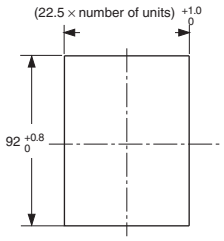
Mounted Separately



Two-Unit Mounting



Group Mounted

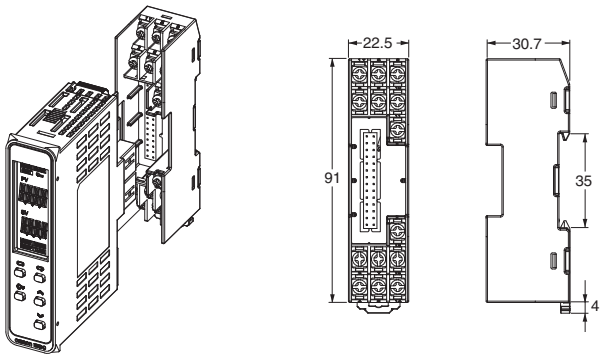


- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- When two or more Digital Termperature Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

Accessories (Order Separately)

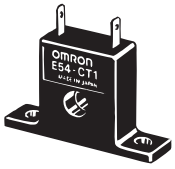
● Terminal Unit

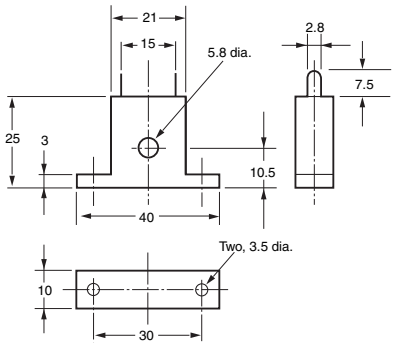
E5DC-SCT1S



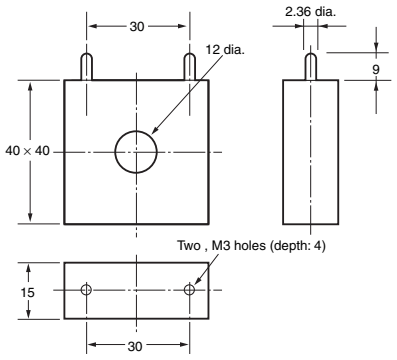
● Current Transformers

E54-CT1



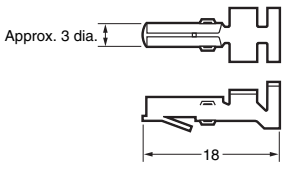


E54-CT3

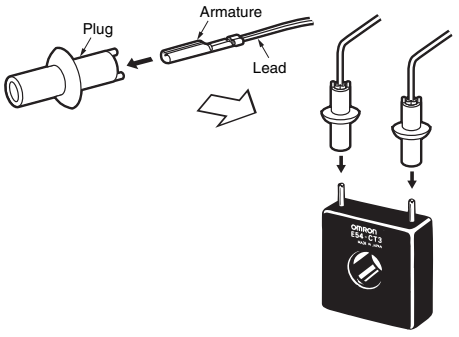


E54-CT3 Accessories

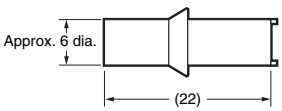
• Armature



Connection Example



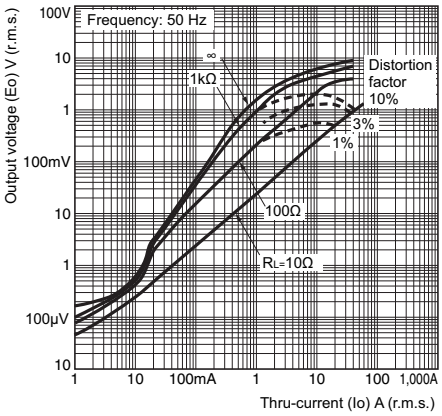
• Plug



Thru-current (Io) vs. Output Voltage (Eo) (Reference Values)

E54-CT1

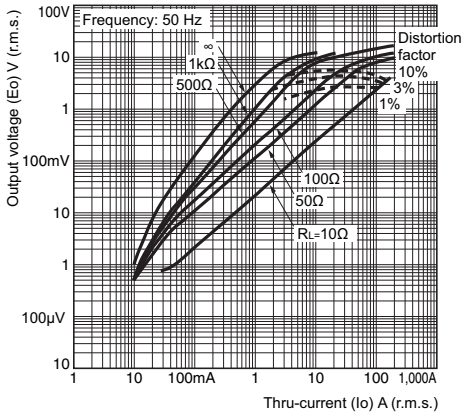
Maximum continuous heater current: 50 A (50/60 Hz)
Number of windings: 400±2
Winding resistance: 18±2 Ω



Thru-current (Io) vs. Output Voltage (Eo) (Reference Values)

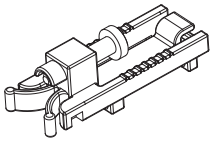
E54-CT3

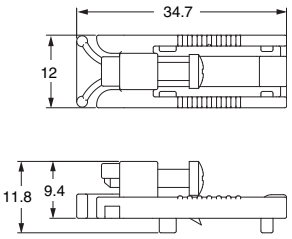
Maximum continuous heater current: 120 A (50/60 Hz) (Maximum continuous heater current for an OMRON Digital Temperature Controller is 50 A.)
Number of windings: 400±2
Winding resistance: 8±0.8 Ω



● Mounting Adapters
Y92F-53 (Two included.)

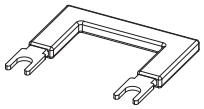
This accessory is not included with the product. Order it separately to mount the product to a panel.

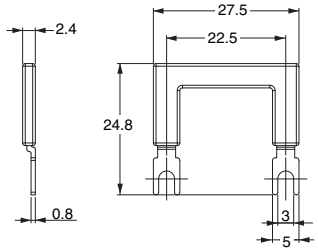




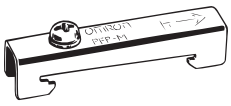
● Short Bars
Y92S-P11 (Four included.)

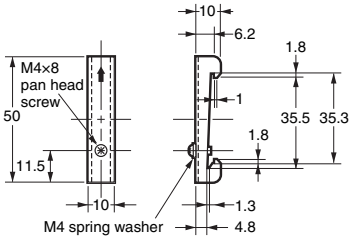
Use this product to connect between terminals (for power supplies, communications, etc.) when you use multiple E5DC-800 Controllers.



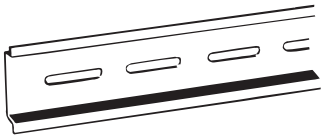


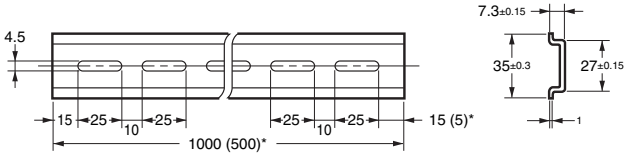
● End Plate
PFP-M





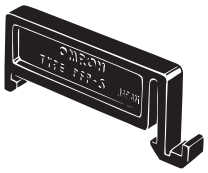
● DIN Tracks
PFP-100N
PFP-50N

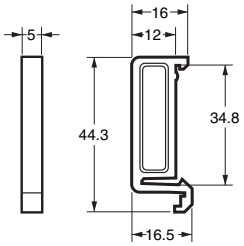




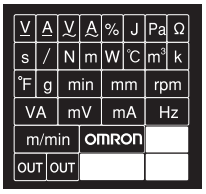
* Dimensions in parentheses are for the PFP-50N.

● Spacer
PFP-S



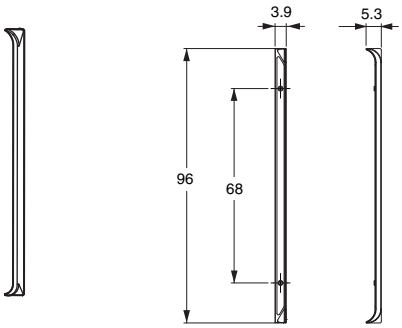


● Unit Labels
Y92S-L2



The Unit Labels for the Digital Panel Meter are used. Use either the °C or °F label from the sheet.

● End Cover
Y92F-54 (Two included.)

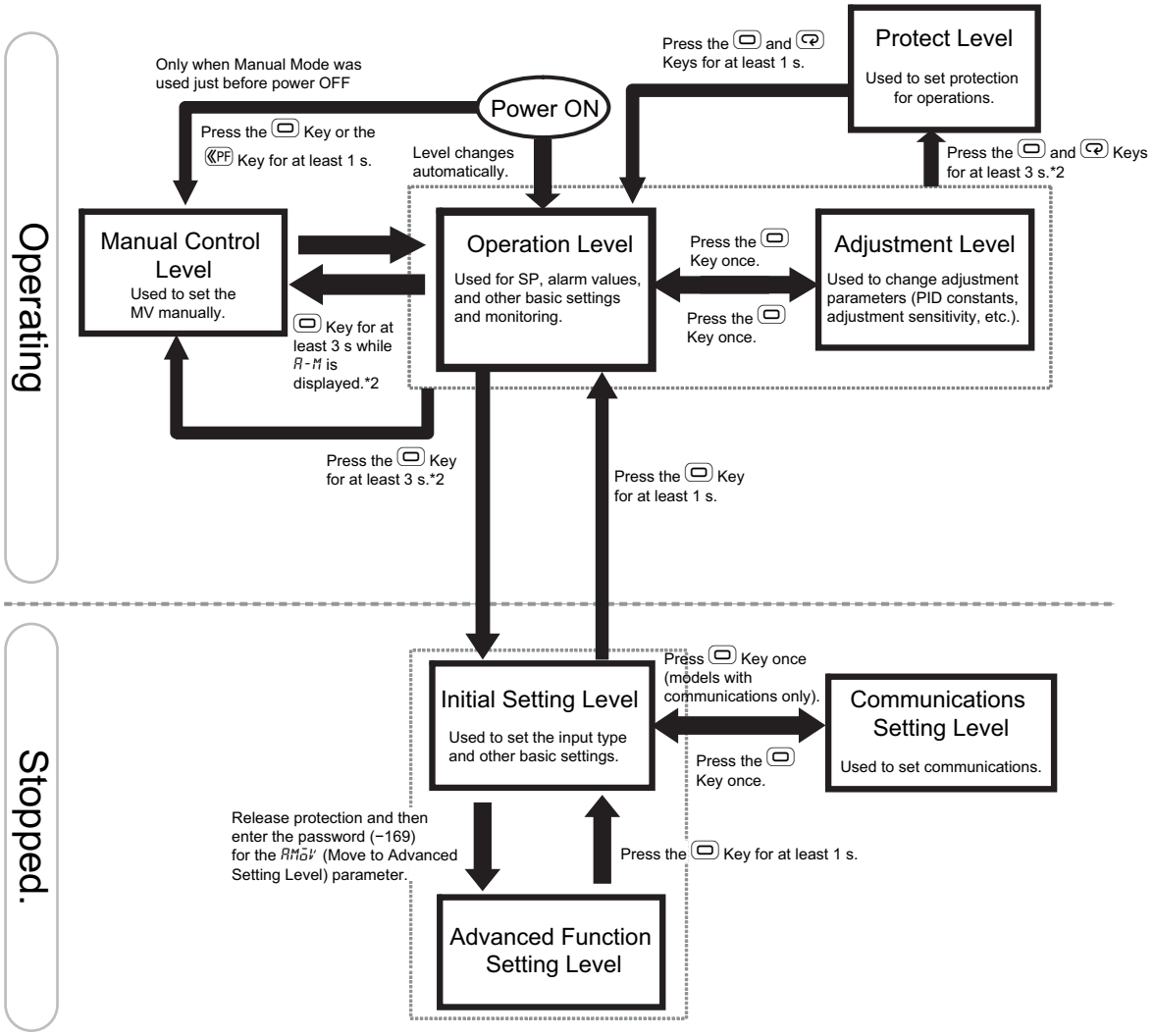


Use the End Cover when you mount the E5DC to a panel to hide the gap between the Controller and the panel.

Operation

Setting Levels Diagram

This diagram shows all of the setting levels. To move to the advanced function setting level and calibration level, you must enter passwords. Some parameters are not displayed depending on the protect level setting and the conditions of use.
Control stops when you move from the operation level to the initial setting level.


Operating
Stopped.
Only when Manual Mode was used just before power OFF
Power ON
Press the Key or the PF Key for at least 1 s.
Level changes automatically.
Press the and Keys for at least 1 s.
Protect Level
Used to set protection for operations.
Press the and Keys for at least 3 s.*2
Manual Control Level
Used to set the MV manually.
Key for at least 3 s while A-M is displayed.*2
Operation Level
Used for SP, alarm values, and other basic settings and monitoring.
Press the Key once.
Press the Key once.
Adjustment Level
Used to change adjustment parameters (PID constants, adjustment sensitivity, etc.).
Press the Key for at least 3 s.*2
Press the Key for at least 1 s.
Press Key once (models with communications only).
Initial Setting Level
Used to set the input type and other basic settings.
Press the Key once.
Communications Setting Level
Used to set communications.
Release protection and then enter the password (−169) for the AMOV (Move to Advanced Setting Level) parameter.
Press the Key for at least 1 s.
Advanced Function Setting Level

*1. To use a key procedure to move to Manual Control Level, set the Auto/Manual Select Addition parameter to ON and set the PF Setting parameter to A-M (Auto/Manual).
*2. The No. 1 display will flash in the middle when the keys are pressed for 1 s or longer.

Error Displays (Troubleshooting)

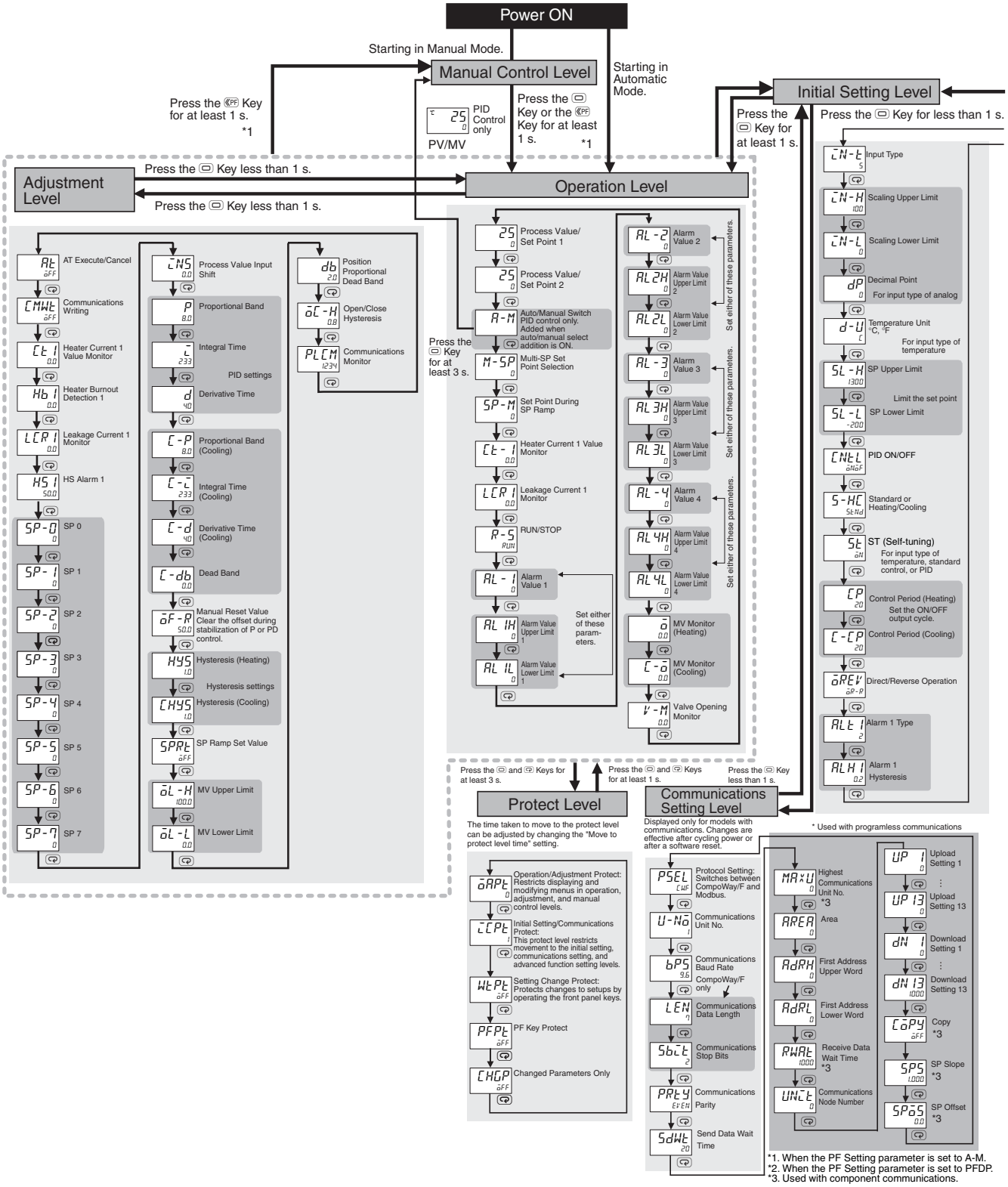
When an error occurs, the No. 1 display or No. 2 display shows the error code.
Take necessary measure according to the error code, referring the following table.

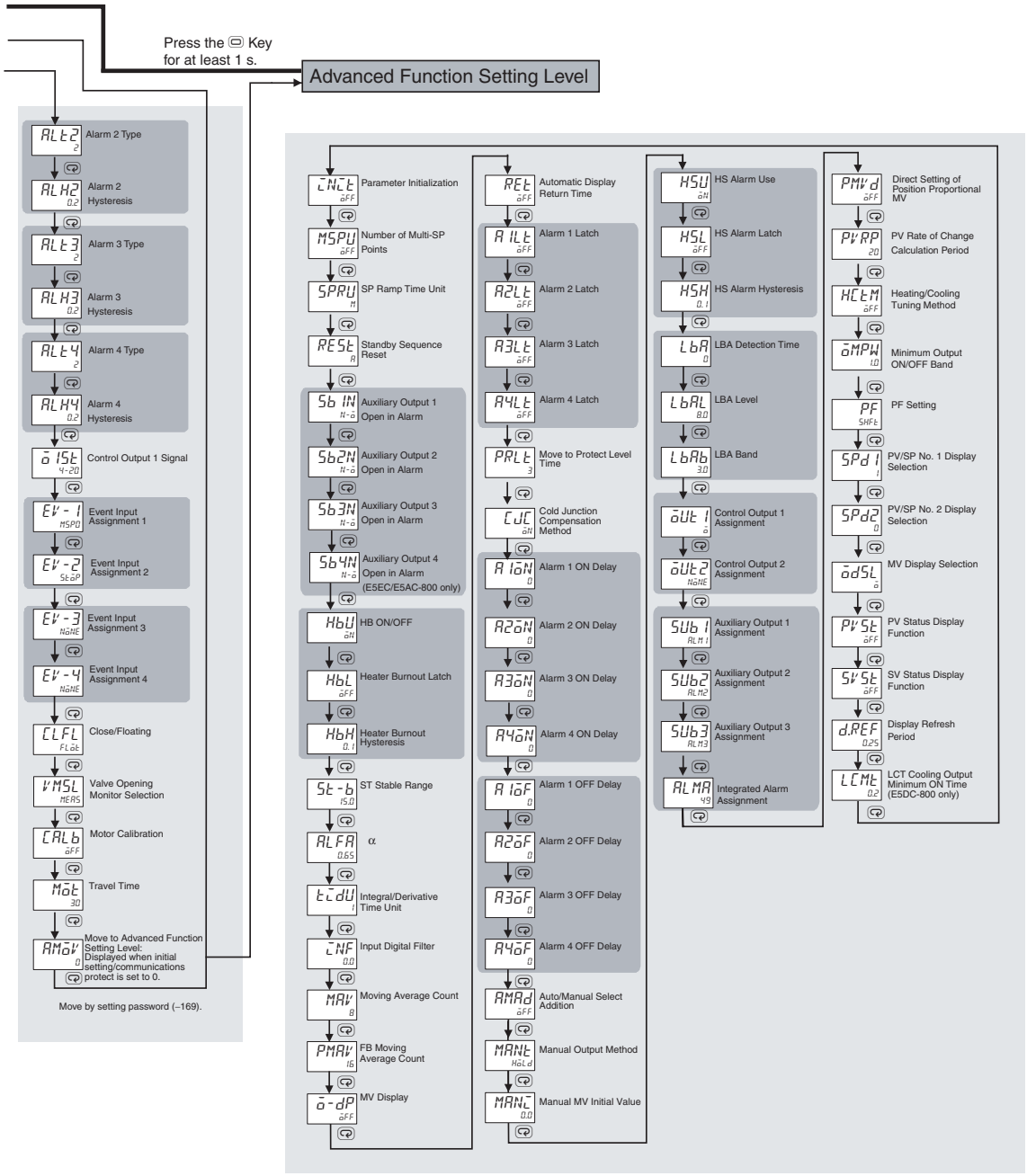
Display	Name	Meaning	Action	Operation
S.ERR	Input error	The input value exceeded the control range.* The input type is not set correctly. The sensor is disconnected or short-circuited. The sensor is not wired correctly. The sensor is not wired. * Control Range Temperature resistance thermometer or thermocouple input: SP Lower Limit - 20°C to SP Upper Limit + 20°C (SP Lower Limit - 40°F to SP Upper Limit + 40°F) ESIB input: Same as specified input range. Analog input: Scaling range -5% to 105%	Check the wiring for input to be sure it is wired correctly, not broken, and not shorted. Also check the input type. If there are no problems in the wiring or input type settings, cycle the power supply. If the display remains the same, replace the Digital Temperature Controller. If the display is restored to normal, then the probable cause is external noise affecting the control system. Check for external noise. **Note:** For a temperature resistance thermometer, the input is considered disconnected if the A, B, or B' line is broken.	After the error occurs and it is displayed, the alarm output will operate as if the upper limit was exceeded. It will also operate as if transfer output exceeded the upper limit. If an input error is assigned to a control output or auxiliary output, the output will turn ON when the input error occurs. The error message will appear in the display for the PV. **Note: 1.** The heating and cooling control outputs will turn OFF. **2.** When the manual MV, MV at stop, or MV at error is set, the control output is determined by the set value.
-2000	Display range exceeded	Below -1,999	-	Control continues and operation is normal. The value will appear in the display for the PV. Refer to the E5□C Digital Controllers User's Manual (Cat. No. H174) for information on the controllable range.
10000		Above 9,999		
E333	A/D converter error	There is an error in the internal circuits.	First, cycle the power supply. If the display remains the same, the controller must be repaired. If the display is restored to normal, then a probable cause can be external noise affecting the control system. Check for external noise.	The control outputs, auxiliary outputs, and transfer outputs turn OFF. (A current output will be approx. 0 mA and a linear voltage output will be approx. 0V.)
E111	Memory error	There is an error in the internal memory operation.	First, cycle the power supply. If the display remains the same, the controller must be repaired. If the display is restored to normal, then a probable cause can be external noise affecting the control system. Check for external noise.	The control outputs, auxiliary outputs, and transfer outputs turn OFF. (A current output will be approx. 0 mA and a linear voltage output will be approx. 0V.)
FFFF	Overcurrent	This error is displayed when the peak current exceeds 55.0 A.	-	Control continues and operation is normal. The error message will appear for the following displays. Heater Current Value 1 Monitor Leakage Current Value 1 Monitor
CT1 LCR1	HB or HS alarm	If there is a HB or HS alarm, the No. 1 display will flash in the relevant setting level.	-	The No. 1 display for the following parameter flashes in Operation Level or Adjustment Level. Heater Current Value 1 Monitor Leakage Current Value 1 Monitor However, control continues and operation is normal.
----	Potentiometer Input Error (Position-proportional Models Only)	"----" will be displayed for the Valve Opening Monitor parameter if any of the following error occurs. • Motor calibration has not been performed. • The wiring of the potentiometer is incorrect or broken. • The potentiometer input value is incorrect (e.g., the input is out of range or the potentiometer has failed).	Check for the above errors.	Close control: The control output is OFF or the value that is set for the MV at PV Error parameter is output. Floating control: Operation will be normal.

Operation

Parameters

The following pages describe the parameters set in each level. Pressing the (Mode) Key at the last parameter in each level returns to the top parameter in that level. Some parameters may not be displayed depending on the model and other settings.


Power ON
Starting in Manual Mode.
Manual Control Level
Starting in Automatic Mode.
Press the Key for at least 1 s. *1
PID Control only
PV/MV
Press the Key or the Key for at least 1 s. *1
Initial Setting Level
Press the Key for at least 1 s.
Press the Key for less than 1 s.
Adjustment Level
Press the Key less than 1 s.
Operation Level
Press the Key less than 1 s.
Press the Key for at least 3 s.
Protect Level
Press the and Keys for at least 3 s.
Press the and Keys for at least 1 s.
Press the Key less than 1 s.
Communications Setting Level
The time taken to move to the protect level can be adjusted by changing the "Move to protect level time" setting.
Displayed only for models with communications. Changes are effective after cycling power or after a software reset.
* Used with programless communications
*1. When the PF Setting parameter is set to A-M.
*2. When the PF Setting parameter is set to PFDP.
*3. Used with component communications.


Press the Key for at least 1 s.
Advanced Function Setting Level
Alarm 2 Type
Alarm 2 Hysteresis
Alarm 3 Type
Alarm 3 Hysteresis
Alarm 4 Type
Alarm 4 Hysteresis
Control Output 1 Signal
Event Input Assignment 1
Event Input Assignment 2
Event Input Assignment 3
Event Input Assignment 4
Close/Floating
Valve Opening Monitor Selection
Motor Calibration
Travel Time
Move to Advanced Function Setting Level: Displayed when initial setting/communications protect is set to 0.
Move by setting password (–169).
Parameter Initialization
Number of Multi-SP Points
SP Ramp Time Unit
Standby Sequence Reset
Auxiliary Output 1 Open in Alarm
Auxiliary Output 2 Open in Alarm
Auxiliary Output 3 Open in Alarm
Auxiliary Output 4 Open in Alarm (E5EC/E5AC-800 only)
HB ON/OFF
Heater Burnout Latch
Heater Burnout Hysteresis
ST Stable Range
α
Integral/Derivative Time Unit
Input Digital Filter
Moving Average Count
FB Moving Average Count
MV Display
Automatic Display Return Time
Alarm 1 Latch
Alarm 2 Latch
Alarm 3 Latch
Alarm 4 Latch
Move to Protect Level Time
Cold Junction Compensation Method
Alarm 1 ON Delay
Alarm 2 ON Delay
Alarm 3 ON Delay
Alarm 4 ON Delay
Alarm 1 OFF Delay
Alarm 2 OFF Delay
Alarm 3 OFF Delay
Alarm 4 OFF Delay
Auto/Manual Select Addition
Manual Output Method
Manual MV Initial Value
HS Alarm Use
HS Alarm Latch
HS Alarm Hysteresis
LBA Detection Time
LBA Level
LBA Band
Control Output 1 Assignment
Control Output 2 Assignment
Auxiliary Output 1 Assignment
Auxiliary Output 2 Assignment
Auxiliary Output 3 Assignment
Integrated Alarm Assignment
Direct Setting of Position Proportional MV
PV Rate of Change Calculation Period
Heating/Cooling Tuning Method
Minimum Output ON/OFF Band
PF Setting
PV/SP No. 1 Display Selection
PV/SP No. 2 Display Selection
MV Display Selection
PV Status Display Function
SV Status Display Function
Display Refresh Period
LCT Cooling Output Minimum ON Time (E5DC-800 only)

Safety Precautions

● Be sure to read the precautions for all E5CC/E5CC-U/E5EC/E5AC/E5DC-800 models in the website at: http://www.ia.omron.com/.

Warning Indications

⚠ CAUTION	**Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.**
Precautions for Safe Use	**Supplementary comments on what to do or avoid doing, to use the product safely.**
Precautions for Correct Use	**Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.**

Meaning of Product Safety Symbols

	Used to warn of the risk of electric shock under specific conditions.
	Used for general prohibitions for which there is no specific symbol.
	Used to indicate prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.
	Used for general CAUTION, WARNING, or DANGER precautions for which there is no specified symbol. (This symbol is also used as the alerting symbol, but shall not be used in this meaning on the product.)
	Used for general mandatory action precautions for which there is no specified symbol.

⚠ CAUTION

Do not touch the terminals while power is being supplied.
Doing so may occasionally result in minor injury due to electric shock.

Electric shock may occur. Do not touch any cables or connectors with wet hands.

Electric shock, fire, or malfunction may occasionally occur. Do not allow metal objects, conductors, cuttings from installation work, or moisture to enter the Digital Temperature Controller or the Setup Tool port or ports.

Do not use the Digital Temperature Controller where subject to flammable or explosive gas. Otherwise, minor injury from explosion may occasionally occur.

Not doing so may occasionally result in fire. Do not allow dirt or other foreign objects to enter the Setup Tool port or ports, or between the pins on the connectors on the Setup Tool cable.

Minor electric shock or fire may occasionally occur. Do not use any cables that are damaged.

Never disassemble, modify, or repair the product or touch any of the internal parts. Minor electric shock, fire, or malfunction may occasionally occur.

CAUTION - Risk of Fire and Electric Shock

a. This product is UL recognised as Open Type Process Control Equipment. It must be mounted in an enclosure that does not allow fire to escape externally.
b. More than one disconnect switch may be required to de-energize the equipment before servicing the product.
c. Signal inputs are SELV, limited energy. *1
d. Caution: To reduce the risk of fire or electric shock, do not interconnect the outputs of different Class 2 circuits. *2

If the output relays are used past their life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and use the output relays within their rated load and electrical life expectancy. The life expectancy of output relays varies considerably with the output load and switching conditions.

Even if you replace only the Main Unit of the E5DC-800 check the condition of the Terminal Unit.
If corroded terminals are used, contact failure in the terminals may cause the temperature inside the Digital Controller to increase, possibly resulting in fire.
If the terminals are corroded, replace the Terminal Unit as well.

Tighten the terminal screws to the rated torque of between 0.43 and 0.58 N•m.
Loose screws may occasionally result in fire.

Set the parameters of the product so that they are suitable for the system being controlled. If they are not suitable, unexpected operation may occasionally result in property damage or accidents.

A malfunction in the product may occasionally make control operations impossible or prevent alarm outputs, resulting in property damage.
To maintain safety in the event of malfunction of the product, take appropriate safety measures, such as installing a monitoring device on a separate line.

*1. E5CC-800, E5EC-800, E5AC-800, and E5DC-800 Controllers that were shipped through November 2013 are UL recognized.
*2. An SELV (separated extra-low voltage) system is one with a power supply that has double or reinforced insulation between the primary and the secondary circuits and has an output voltage of 30 V r.m.s. max. and 42.4 V peak max. or 60 VDC max.
*3. A class 2 circuit is one tested and certified by UL as having the current and voltage of the secondary output restricted to specific levels.
*4. The specified torque is 0.5 N·m for the E5CC-U.

Precautions for Safe Use

Be sure to observe the following precautions to prevent malfunction or adverse affects on the performance or functionality of the product. Not doing so may occasionally result in faulty operation.

1. This product is specifically designed for indoor use only.
   Do not use this product in the following places:
   - Places directly subject to heat radiated from heating equipment.
   - Places subject to splashing liquid or oil atmosphere.
   - Places subject to direct sunlight.
   - Places subject to dust or corrosive gas (in particular, sulfide gas and ammonia gas).
   - Places subject to intense temperature change.
   - Places subject to icing and condensation.
   - Places subject to vibration and large shocks.
2. Use and store the product within the rated ambient temperature and humidity.
   Gang-mounting two or more Digital Temperature Controllers, or mounting Digital Temperature Controllers above each other may cause heat to build up inside the Digital Temperature Controllers, which will shorten their service life. In such a case, use forced cooling by fans or other means of air ventilation to cool down the Digital Temperature Controllers.
3. To allow heat to escape, do not block the area around the Digital Temperature Controller.
   Do not block the ventilation holes on the Digital Temperature Controller.
4. Be sure to wire properly with correct polarity of terminals.
5. Use the specified size of crimped terminals (M3, width of 5.8 mm or less) to wire the E5CC-800, E5EC-800, E5AC-800, or E5DC-800. To connect bare wires to the terminal block of the E5CC-800, E5EC-800, E5AC-800, or E5DC-800, use copper braided or solid wires with a gage of AWG24 to AWG18 (equal to a cross-sectional area of 0.205 to 0.8231 mm^2). (The stripping length is 6 to 8 mm.)
   Up to two wires of the same size and type, or two crimped terminals can be inserted into a single terminal.
   Use the specified size of crimped terminals (M3.5, width of 7.2 mm or less) to wire the E5CC-U-800. To connect bare wires to the terminal block of the E5CC-U-800, use copper braided or solid wires with a gage of AWG24 to AWG14 (equal to a cross-sectional area of 0.205 to 2.081 mm^2). (The stripping length is 5 to 6 mm.)
   Up to two wires of the same size and type, or two crimped terminals, can be inserted into a single terminal.
6. Do not wire the terminals that are not used.
7. Use a commercial power supply for the power supply voltage input to a Digital Temperature Controller with AC input specifications. Do not use the output from an inverter as the power supply. Depending on the output characteristics of the inverter, temperature increases in the Digital Temperature Controller may cause smoke or fire damage even if the inverter has a specified output frequency of 50/60 Hz.
8. To avoid inductive noise, keep the wiring for the product's terminal block away from power cables carry high voltages or large currents. Also, do not wire power lines together with or parallel to product wiring. Using shielded cables and using separate conduits or ducts is recommended.
   Attach a surge suppressor or noise filter to peripheral devices that generate noise (in particular, motors, transformers, solenoids, magnetic coils, or other equipment that have an inductance component).
   When a noise filter is used at the power supply, first check the voltage or current, and attach the noise filter as close as possible to the product.
   Allow as much space as possible between the product and devices that generate powerful high frequencies (high-frequency welders, high-frequency sewing machines, etc.) or surge.
9. Use this product within the rated load and power supply.
10. Make sure that the rated voltage is attained within two seconds of turning ON the power using a switch or relay contact. If the voltage is applied gradually, the power may not be reset or output malfunctions may occur.
11. Make sure that the Digital Temperature Controller has 30 minutes or more to warm up after turning ON the power before starting actual control operations to ensure the correct temperature display.
12. When executing self-tuning for the E5DC-800, turn ON power to the load (e.g., heater) at the same time as or before supplying power to the product. If power is turned ON to the product before turning ON power to the load, self-tuning will not be performed properly and optimum control will not be achieved.
13. A switch or circuit breaker must be provided close to the product. The switch or circuit breaker must be within easy reach of the operator, and must be marked as a disconnecting means for this unit.
14. Use a soft and dry cloth to clean the product carefully. Do not use organic solvent, such as paint thinner, benzine or alcohol to clean the product.
15. Design the system (e.g., control panel) considering the 2 seconds of delay that the product's output to be set after power ON.
16. The output may turn OFF when you move to the initial setting level. Take this into consideration when performing control operations.
17. The number of non-volatile memory write operations is limited. Therefore, use RAM write mode when frequently overwriting data, e.g., through communications.
18. Use suitable tools when taking the Digital Temperature Temperature Controller apart for disposal. Sharp parts inside the Digital Temperature Controller may cause injury.
19. For compliance with Lloyd's standards, the E5CC-800, E5CC-U-800, E5EC-800, E5AC-800, and E5DC-800 must be installed under the conditions that are specified in *Shipping Standards*.
20. Do not touch the external power supply terminals or other metal parts on the Digital Temperature Controller.
21. Do not exceed the communications distance that is given in the specifications. Use the specified communications cable.
    Refer to the E5□C Digital Controllers User's Manual (Cat. No. H174) for information on the communications distances and cables.
22. Do not bend the communications cables past their natural bending radius. Do not pull on the communications cables.
23. Connectors may be damaged if they are inserted with excessive force. When connecting a connector, always make sure that it is oriented correctly. Do not force the connector if it does not connect smoothly.
24. For the E5DC-800, when you attach the Main Unit to the Terminal Unit, make sure that the hooks on the Main Unit are securely inserted into the Terminal Unit.
25. For the E5CC-U-800, when you attach the Main Unit to the socket, make sure that the hooks on the socket are securely inserted into the Main Unit.
26. Install the DIN Track vertically to the ground.
27. For the E5DC-800, always turn OFF the power supply before connecting the Main Unit to or disconnecting the Main Unit from the Terminal Unit, and never touch nor apply shock to the terminals or electronic components. When connecting or disconnecting the Main Unit, do not allow the electronic components to touch the case.

Shipping Standards

The E5CC-800, E5CC-U-800, E5EC-800, E5AC-800, and E5DC-800 comply with Lloyd's standards. When applying the standards, the following installation and wiring requirements must be met in the application.

Application Conditions

●Installation Location

The E5CC-800, E5CC-U-800, E5EC-800, E5AC-800, and E5DC-800 comply with installation category ENV1 and ENV2 of Lloyd's standards. Therefore, they must be installed in a location equipped with air conditioning. They cannot be used on the bridge or decks, or in a location subject to strong vibration.

Precautions for Correct Use

●Service Life

1. Use the product within the following temperature and humidity ranges:
   Temperature: -10 to 55°C (with no icing or condensation)
   Humidity: 25% to 85%
   If the product is installed inside a control board, the ambient temperature must be kept to under 55°C, including the temperature around the product.
2. The service life of electronic devices like Digital Temperature Controllers is determined not only by the number of times the relay is switched but also by the service life of internal electronic components.
   Component service life is affected by the ambient temperature: the higher the temperature, the shorter the service life and, the lower the temperature, the longer the service life. Therefore, the service life can be extended by lowering the temperature of the Digital Temperature Controller.
3. When two or more Digital Temperature Controllers are mounted horizontally close to each other or vertically next to one another, the internal temperature will increase due to heat radiated by the Digital Temperature Controllers and the service life will decrease. In such a case, use forced cooling by fans or other means of air ventilation to cool down the Digital Temperature Controllers. When providing forced cooling, however, be careful not to cool down the terminals sections alone to avoid measurement errors.

●Measurement Accuracy

1. When extending or connecting the thermocouple lead wire, be sure to use compensating wires that match the thermocouple types.
2. When extending or connecting the lead wire of the platinum resistance thermometer, be sure to use wires that have low resistance and keep the resistance of the three lead wires the same.
3. Mount the product so that it is horizontally level.
4. If the measurement accuracy is low, check to see if input shift has been set correctly.

●Waterproofing (Not applicable to the E5CC-U-800/E5DC-800)

The degree of protection is as shown below. Sections without any specification on their degree of protection or those with IP□0 are not waterproof.
Front panel: IP66, Rear case: IP20, Terminal section: IP00
When waterproofing is required, insert the Waterproof Packing on the backside of the front panel. The degree of protection when the Waterproof Packing is used is IP66. To maintain an IP66 degree of protection, the Waterproof Packing and the Port Cover must be periodically replaced because they may deteriorate, shrink, or harden depending on the operating environment. The replacement period will vary with the operating environment. Check the required period in the actual application. Use 3 years or sooner as a guideline. If the Waterproof Packing and Port Cover are not periodically replaced, waterproof performance may not be maintained. If a waterproof structure is not required, then the Waterproof Packing does not need to be installed.

●Operating Precautions

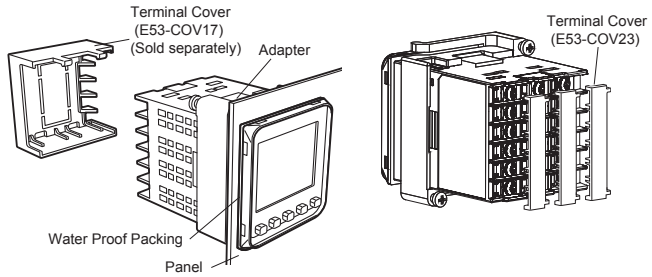
1. When starting operation after the Digital Temperature Controller has warmed up, turn OFF the power and then turn it ON again at the same time as turning ON power for the load. (Instead of turning the Digital Temperature Controller OFF and ON again, switching from STOP mode to RUN mode can also be used.)
2. Avoid using the Controller in places near a radio, television set, or wireless installing. These devices can cause radio disturbances which adversely affect the performance of the Controller.

● Mounting

Mounting to a Panel

E5CC-800

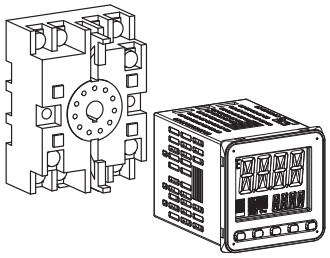
There are two models of Terminal Covers that you can use with the E5CC-800.



1. For waterproof mounting, waterproof packing must be installed on the Controller. Waterproofing is not possible when group mounting several Controllers. Waterproof packing is not necessary when there is no need for the waterproofing function.
2. Insert the E5CC-800 into the mounting hole in the panel.
3. Push the adapter from the terminals up to the panel, and temporarily fasten the E5CC-800.
4. Tighten the two fastening screws on the adapter.
   Alternately tighten the two screws little by little to maintain a balance. Tighten the screws to a torque of 0.29 to 0.39 N·m.

E5CC-U-800

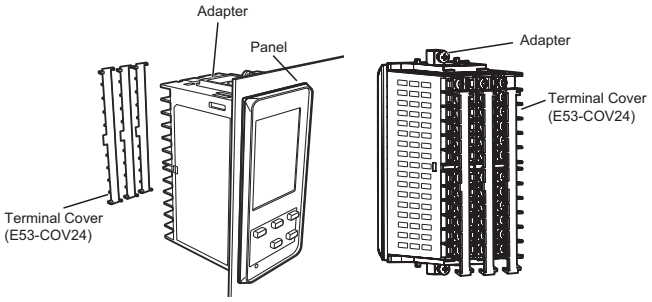
For the Wiring Socket for the E5CC-U-800, purchase the P2CF-11 or PG3A-11 separately.



1. For waterproof mounting, waterproof packing must be installed on the Controller. Waterproofing is not possible when group mounting several Controllers. Waterproof packing is not necessary when there is no need for the waterproofing function.
   The E5CC-U-800 cannot be waterproofed even if the Waterproof Packing is inserted.
2. Insert the E5CC/E5CC-U-800 into the mounting hole in the panel.
3. Push the adapter from the terminals up to the panel, and temporarily fasten the E5CC-800.

4. Tighten the two fastening screws on the adapter. Alternately tighten the two screws little by little to maintain a balance. Tighten the screws to a torque of 0.29 to 0.39 N·m.

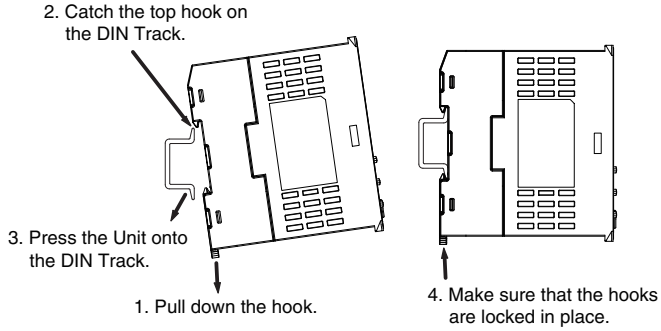
E5EC/E5AC-800



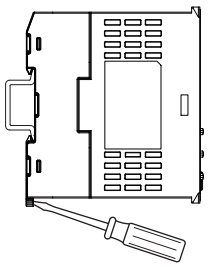
1. For waterproof mounting, waterproof packing must be installed on the Controller. Waterproofing is not possible when group mounting several Controllers. Waterproof packing is not necessary when there is no need for the waterproofing function.
2. Insert the E5EC/E5AC-800 into the mounting hole in the panel.
3. Push the adapter from the terminals up to the panel, and temporarily fasten the E5EC/E5AC-800.
4. Tighten the two fastening screws on the adapter. Alternately tighten the two screws little by little to maintain a balance. Tighten the screws to a torque of 0.29 to 0.39 N·m.

Mounting to and Removing from DIN Track E5DC-800

- Mounting a Unit
  Pull down the DIN Track hook on the Terminal Unit and catch the top hook on the DIN Track.
  Press the Unit onto the DIN Track until the DIN Track hooks are locked in place.

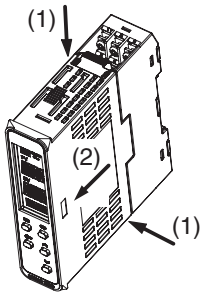

2. Catch the top hook on the DIN Track.
3. Press the Unit onto the DIN Track.
1. Pull down the hook.
4. Make sure that the hooks are locked in place.

- Removing a Unit
  Pull down on the DIN Track Hook with a flat-blade screwdriver and lift up the Unit.



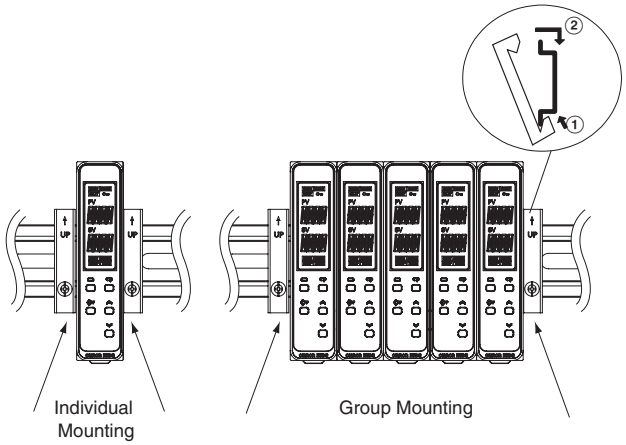
Removing the Main Unit

Press in the two hooks on the Main Unit and remove the Main Unit from the Terminal Unit.



End Plate Installation

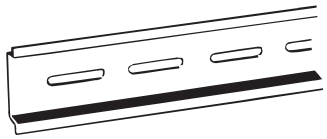
Make sure to attach PFP-M End Plates to the ends of the Units.



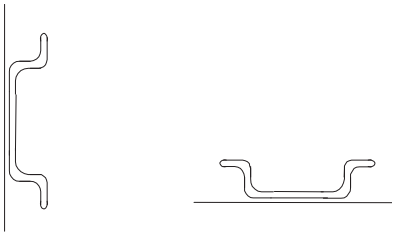
Mounting the DIN Track

Attach the DIN Track to the inside of the control panel with screws to at least three locations.

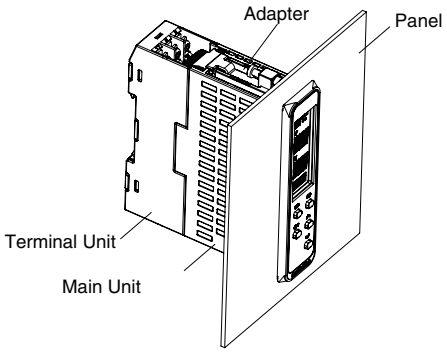
- DIN Track (sold separately)
  PFP-50N (50 cm) and PFP-100N (100 cm)



Install the DIN Track vertically to the ground.



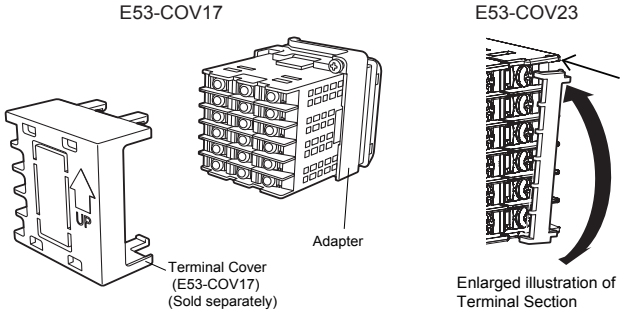
Mounting to a Panel
E5DC-800



1. Insert the E5DC-800 into the mounting hole in the panel. (Attach the Terminal Unit after you insert the Main Unit.)
2. Push the Adapter from the Terminal Unit up to the panel, and temporarily fasten the E5DC-800.
3. Tighten the two fastening screws on the Adapter. Alternately tighten the two screws little by little to maintain a balance. Tighten the screws to a torque of 0.29 to 0.39 N·m.

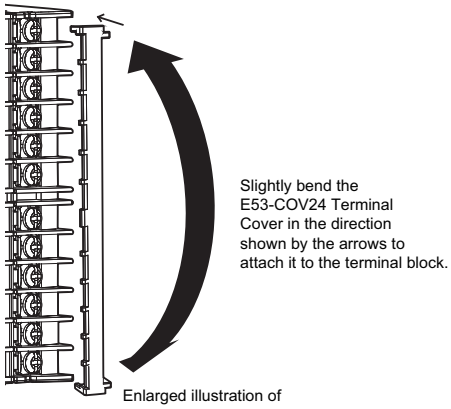
Mounting the Terminal Cover
E5CC-800

Slightly bend the E53-COV23 Terminal Cover to attach it to the terminal block as shown in the following diagram. The Terminal Cover cannot be attached in the opposite direction. E53-COV17 Terminal Cover can be also attached.
Make sure that the "UP" mark is facing up, and then attach the E53-COV17 Terminal Cover to the holes on the top and bottom of the Digital Temperature Controller.



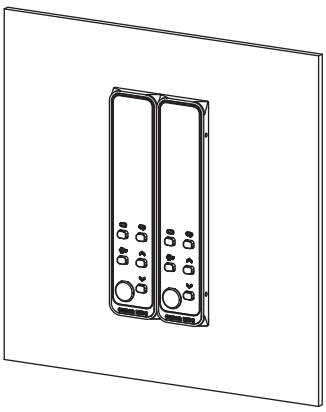
E5EC/E5AC-800

Slightly bend the E53-COV24 Terminal Cover to attach it to the terminal block as shown in the following diagram. The Terminal Cover cannot be attached in the opposite direction.

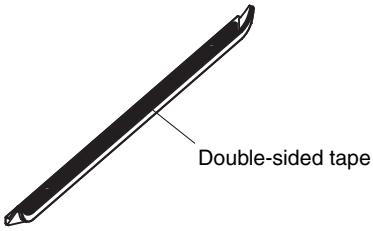


Attaching the End Cover
E5DC-800

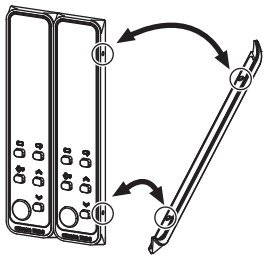
1. Install the E5DC-800 in a panel.

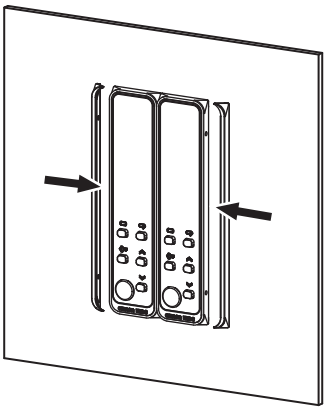


2. Peel off the release paper from the double-sided tape on the End Cover.

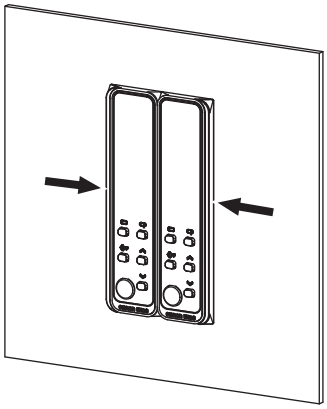


3. Align the tabs on the End Cover with the depressions on the E5DC-800 and attach the End Cover.



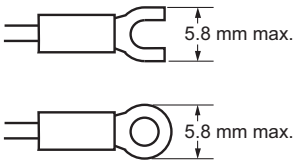


4. Secure the End Cover so that the double-sided tape is firmly attached.

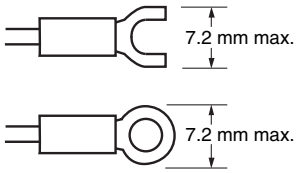


● Precautions when Wiring

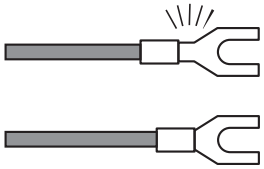
- Separate input leads and power lines in order to prevent external noise.
- Use a shielded, AWG24 to AWG18 (cross-sectional area of 0.205 to 0.8231 mm^2) twisted-pair cable. Use a shielded, AWG24 to AWG14 (cross-sectional area of 0.205 to 2.081 mm^2) twisted-pair cable for the E5CC-U-800. The stripping length is 6 to 8 mm for the E5CC-800, E5EC-800, E5AC-800, or E5DC-800 and 5 to 6 mm for the E5CC-U-800.
- Use crimp terminals when wiring the terminals.
- Use the suitable wiring material and crimp tools for crimp terminals.
- Tighten the terminal screws to a torque of 0.43 to 0.58 N·m. The specified torque is 0.5 N·m for the E5CC-U-800.
- For the E5CC-800, E5EC-800, E5AC-800, or E5DC-800, use the following types of crimp terminals for M3 screws.



- For the E5CC-U-800, use the following types of crimp terminals for M3.5 screws.



- If you use crimp terminals for the E5DC-800, use crimp terminals with insulation sleeves. If you use a bare crimp terminal with no insulation, the terminal may short with the terminal above or below it. If you use bare crimp terminals, cover the crimped sections with insulating marking tubes. Secure the marking tubes so that they do not move.



Although you can connect two crimp terminals with insulation sleeves to one terminal, you cannot do so if the diameter of the insulation sleeves is too large.

Recommended Crimp Terminals with Insulation Sleeves for the E5DC-800

Manufacturer	Model number
J.S.T. Mfg. Co.	V1.25-B3A V0.5-3A

MEMO

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OMRON Corporation **Industrial Automation Company**
Tokyo, JAPAN
Contact: www.ia.omron.com

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08(Lobby 2),
Alexandra Technopark, Singapore 119967
Tel: 65-6835-3011/Fax: 65-6835-2711

OMRON TAIWAN ELECTRONICS INC.
6F, Home Young Budg., No.363,
Fu-Shing N.Road, Taipei, Taiwan R.O.C
Tel: (886) 2-2715-3331/Fax: (886) 2-2712-6712

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